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6

REPORT

OF THE

TESTS OF METALS

AND

OTHER MATERIALS

FOR

INDUSTRIAL PURPOSES

MADE WITH THE

UNITED STATES TESTING MACHINE AT WATERTOWN ARSENAL,
MASSACHUSETTS,

DURING

THE FISCAL YEAR ENDED JUNE 30, 1898.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1899.

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LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

A copy of the report of the commanding officer of the Watertown Arsenal of "Tests of iron, steel, and other materials" made during the fiscal year ended June 30, 1898.

WAR DEPARTMENT,
WASHINGTON, *January 11, 1899.*

SIR: I have the honor to transmit herewith, as required by law, copy of report of the commanding officer of the Watertown Arsenal of "Tests of iron, steel, and other materials for industrial purposes," made at that arsenal during the fiscal year ended June 30, 1898.

Very respectfully,

R. A. ALGER, *Secretary of War.*

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

WATERTOWN ARSENAL,
Watertown, Mass., January 5, 1899.

SIR: I have the honor to submit herewith, in compliance with law, the following report of tests of metals, etc., made at this arsenal during the fiscal year ending June 30, 1898.

The total number of specimens tested during the year was 2,188, classified as follows:

Gun specimens	157
For Ordnance Department	430
For other Government departments	10
Investigative tests	704
Tests for private parties	887
Total	2,188

The receipts and expenditures were as follows:

Amount appropriated for testing machine and testing work	$10,000.00
Received from private parties during the year	1,166.76
Total received	11,166.76
Amount expended for service and labor	9,048.89
Amount expended for light, power, and tools, implements, and materials for test	2,117.87
Total expended	11,166.76

The work of the testing department has comprised during the past fiscal year, as in years before, tests of material representing current work of the Ordnance Department in progress at this arsenal and in other places; tests of material for private parties, in accordance with a provision of the law which places the testing machine at the service of any citizen of the United States upon his defraying the actual cost of such service; and tests of material of a general and investigative character, having for their object the development of data upon the strength of the materials of construction, information of value alike for civil engineering and architectural purposes as well as for the military departments of the Government.

The tests made for the Ordnance Department represent the metal used in the various calibers of field, siege, and seacoast rifles and mortars, also the metal used in the carriages for these several classes of ordnance.

Metal has been tested for small arms, barrels and receivers, anchor bolts for gun and mortar carriages, helical springs for 5-inch gun and 7-inch mortar carriages, and proof stresses applied to piston rods for disappearing-gun carriages. Tests have also been made of cast iron and steel for shot and shell and soft steel caps for armor-piercing projectiles.

The internal strains in 3-inch and 5-inch single-forging guns have been the subject of special inquiry.

These strains are introduced intothe metal by heating the forging throughout and then rapidly cooling the same from the bore. This treatment introduces internal strains of compression at and immediately below the surfaces first quenched, with tensile strains in the parts of the forging which cool last.

According to the temperature of the metal at the time of quenching and the activity of the quenching fluid the internal strains may attain a magnitude coincident with the elastic limit of the metal.

Tests on 3.2-inch and 5-inch cast-iron shells comprised in addition to the direct longitudinal compressive effects observations on the diametrical expansion of the metal.

The tensile tests of cast iron from the arsenal foundry are accompanied by a record of the furnace charges. There are also tests of pig irons and chemical analyses of the same.

Tests of plain and welded steel bars were made, steel for chain cable, cold-rolled metal, and specimens tested for standardizing a testing machine at private works furnishing material for ordnance purposes.

Tests were made upon nickel steel, wrought iron, cast iron for the impact-testing machine and for the microscope carriage of the standard comparator; also cast iron furnished by private parties on contracts for Government material.

Special apparatus was employed in making roller-bearing tests, in which a falling weight was used to impart a rotary movement to a weighted journal working in the bearings under examination.

In the same apparatus were made tests on plain lubricated journals. The difference in frictional resistance between the two types of bearings is well illustrated in these comparative tests.

A number of photomicrographs accompany this report, showing the microstructure of steel rails, the mechanical properties of which may be found in Report 1891, and photographs of rifle barrel and receiver steel, tests of which are included in the present report.

Additional tests of manila and sisal cordage are contained herein, the main series of cordage tests appearing in the Report 1897.

Tests of stone by cubic compression were made in which samples of limestone and marble were placed in a hydraulic cylinder and exposed to a pressure of 30,000 pounds per square inch, a pressure largely exceeding the compressive strength of the stones when tested in the ordinary manner.

No apparent injury was done by this high cubic compression, as subsequent free tests showed normal strength in the samples.

Fire-proofed wood was tested. The specific object of the treatment, to render the wood noninflammable, was attained. The chemical salts employed are soluble in water and when washed out the wood resumes its ordinary inflammable condition. The treatment causes loss in strength and in toughness, changes the natural color of the wood to a darker hue, and ordinary conditions of exposure to the weather result in the efflorescence of the chemical salts.

Concrete tests form an important part of the present report.

A series of 544 specimens were furnished by the State of New York, representing in their composition all of the Portland cements manufactured in that State in the year 1896.

There were cinder concretes furnished by the Eastern Expanded Metal Company, of Boston, and a series of stone concretes made at this arsenal.

The features investigated related to the influence of composition on the compressive strength of the material, the effect of different kinds of treatment when weathering, the consistency of the mortar, the relation between broken stone and pebble concrete, and the influence of the size of the broken stone or pebbles on the ultimate strength of the mixtures.

Several brands of cement were used in the cinder concretes and in those made at the arsenal, although in the latter series this was an incidental feature, most of the samples being made of one brand in order to obtain comparable results with different-sized stones.

Much attention was given to a determination of the compressibility of the concrete under different loads and the development of permanent sets.

These determinations of elastic properties should afford material aid in arriving at what are safe working loads for the material to endure.

Chemical analyses have been made of steels, cast and pig irons representing the metal used in small arms and seacoast guns, gun carriages, and shells.

The apparatus for making endurance tests of rotating shafts, referred to in the last annual report, has been completed and is now in operation.

This machine accommodates six specimens, thereby expediting the investigation of the endurance of metals to repeated stresses, and with the facilities which it possesses of applying longitudinal stresses of tension or compression in combination with traverse loads introduces new conditions of test and beneficially extends the scope of the inquiry.

The vertical-impact machine has also been completed and placed in position in the testing building. Tests of this class will be inaugurated during the present fiscal year.

The need of a small tension testing machine to supplement the large one, upon which all tests of whatever magnitude now have to be made, was never more conspicuously felt that during the past year.

Much of the work for the Department required immediate action, which in turn necessitated frequent changes of the large machine in passing from one class of testing to another. This prevented continuous work in any investigative direction and consumed much time which was lost in testing.

The testing department has grown much within the seven years that I have had charge of this arsenal, while the original appropriation of $10,000 annually remains the same and is not sufficient to proper conduct of the department. This amount should be increased to $15,000 annually.

I desire to acknowledge the valuable services of Mr. J. E. Howard, C. E., in superintending the work of the testing department.

Very respectfully, your obedient servant,

J. W. REILLY,
Major, Ordnance Department, U. S. A., Commanding.

The CHIEF OF ORDNANCE, U. S. A.,
Washington, D. C.

REPORT

OF THE

TESTS OF METALS AND OTHER MATERIALS

FOR

INDUSTRIAL PURPOSES,

MADE WITH THE

UNITED STATES TESTING MACHINE AT WATERTOWN ARSENAL,
MASSACHUSETTS,

DURING THE

FISCAL YEAR ENDED JUNE 30, 1898.

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3.2-INCH B. L. STEEL FIELD GUNS.

SPECIMENS FROM TUBES AND JACKETS.

TUBE.

No. 5820.

Marks, $\substack{32\ R\ 197\ T \\ M\ T_1\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	.0	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000550	.000250	....	....	
6,000	30,000	.000950	.000400	....	....	
7,000	35,000	.001100	.000150	0.	....	
8,000	40,000	.001250	.000150	....	....	
8,400	42,000	.001350	.000100	0.	....	
8,600	43,000	.001400	.000050	....	....	
8,800	44,000	.001450	.000050	....	....	
9,000	45,000	.001500	.000050	....	....	
9,200	46,000	.001500	0.	....	....	
9,400	47,000	.001550	.000050	....	....	
9,600	48,000	.001550	0.	....	....	
9,800	49,000	.001600	.000050	....	....	
10,000	50,000	.001600	0.	....	....	
10,200	51,000	.001650	.000050	....	....	
10,400	52,000	.001700	.000050	....	....	
10,600	53,000	.001750	.000050	....	....	
10,800	54,000	.001850	.000100	....	....	
11,000	55,000	.001900	.000050	....	....	
11,200	56,000	.001950	.000050	....	....	Elastic limit.
11,400	57,000	.003500	.001550	....	....	
11,600	58,000	.005000	.001500	....	....	
11,800	59,000	.008000	.003000	....	....	
12,000	60,000	.009000	.001000	....	....	
12,200	61,000	.010100	.001100	....	....	
18,510	92,550	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square insh of original section	pounds..	92,550
Elastic limit per square inch of original section	do...	56,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.001950
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		″.7 from neck
Character of broken surface		silky
Elongation of inch sections		″.33*, ″.09

TUBE.

No. 5821.

Marks, $\substack{32\ R_{,}\ T \\ M\ T,\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000600	.000300	....	....	
6,000	30,000	.000900	.000300	....	....	
7,000	35,000	.001150	.000250	0.	....	
8,000	40,000	.001400	.000250	....	....	
8,400	42,000	.001450	.000050	0.	....	
8,600	43,000	.001450	0.	....	....	
8,800	44,000	.001500	.000050	....	....	
9,000	45,000	.001500	0.	....	....	
9,200	46,000	.001550	.000050	....	....	
9,400	47,000	.001550	0.	....	....	
9,600	48,000	.001600	.000050	....	....	
9,800	49,000	.001650	.000050	....	....	
10,000	50,000	.001700	.000050	....	....	
10,200	51,000	.001750	.000050	....	....	
10,400	52,000	.001800	.000050	....	....	
10,600	53,000	.001850	.000050	....	....	
10,800	54,000	.001900	.000050	....	....	
11,000	55,000	.001950	.000050	....	....	
11,200	56,000	.001950	0.	....	....	Elastic limit.
11,400	57,000	.003500	.001550	....	....	
11,600	58,000	.006000	.002500	....	....	
11,800	59,000	.009150	.003150	....	....	
12,000	60,000	.010000	.000850	....	....	
12,200	61,000	.011000	.001000	....	....	
18,820	94,100	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds..	94,100
Elastic limit per square inch of original section .... do...	56,000
Elongation per inch after rupture .... inch..	.2100
Elongation per inch under strain at elastic limit .... do...	.001950
Reduction in diameter at point of rupture .... do...	.125
Reduction in area after rupture, per cent of original section	43.3
Position of rupture	1″ from neck
Character of broken surface	silky
Elongation of inch sections	″.18, ″.29*

TUBE.

No. 5822.

Marks, $^{32\ R_{10}\ T}_{M\ T,\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000100	.000100	0.	....	
2, 000	10, 000	.000300	.000200	....	....	
4, 000	20, 000	.000600	.000300	....	....	
6, 000	30, 000	.001000	.000400	....	....	
7, 000	35, 000	.001150	.000150	.000050	.000050	
8, 000	40, 000	.001350	.000200	....	....	
8, 200	41, 000	.001400	.000050	....	....	Elastic limit.
8, 400	42, 000	.001600	.000200	.000400	.000350	
8, 600	43, 000	.001900	.000300	....	....	
8, 800	44, 000	.002900	.001000	....	....	
9, 000	45, 000	.005150	.002250	....	....	
9, 200	46, 000	.009750	.004600	....	....	
16, 290	81, 450	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	81, 450
Elastic limit per square inch of original section	do...	41, 000
Elongation per inch after rupture	inch..	.2450
Elongation per inch under strain at elastic limit	do...	.001400
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		1″.2 from neck
Character of broken surface		silky
Elongation of inch sections		″.21, ″.28*

TUBE.

No. 5823.

Marks, $\genfrac{}{}{0pt}{}{\text{32 R 202 T}}{\text{M T}_2\text{ M}}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.		
2,000	10,000	.000300	.000200			
4,000	20,000	.000650	.000350			
6,000	30,000	.000950	.000300			
7,000	35,000	.001100	.000150	0.		
8,000	40,000	.001200	.000100			
8,400	42,000	.001300	.000100	.000050	.000050	
8,600	43,000	.001350	.000050			
8,800	44,000	.001400	.000050			
9,000	45,000	.001450	.000050			
9,200	46,000	.001500	.000050			
9,400	47,000	.001550	.000050			
9,600	48,000	.001600	.000050			
9,800	49,000	.001650	.000050			
10,000	50,000	.001650	0.			Elastic limit.
10,200	51,000	.016000	.014350			
10,400	52,000	.016750	.000750			
10,600	53,000	.017350	.000600			
10,800	54,000	.018400	.001050			
11,000	55,000	.019500	.001100			
17,260	86,300					Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	86,300
Elastic limit per square inch of original section ....do...	50,000
Elongation per inch after rupture ....inch..	.2500
Elongation per inch under strain at elastic limit ....do...	.001650
Reduction in diameter at point of rupture ....do...	.125
Reduction in area after rupture, per cent of original section	43.3
Position of rupture	1″.1 from neck
Character of broken surface	silky
Elongation of inch sections	″.19, ″.31*

TUBE.

No. 5824.

Marks, $\substack{\text{32 R 203 T}\\ \text{M T, M}}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1.000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000350	.000250	....	....	
4,000	20,000	.000700	.000350	....	....	
6,000	30,000	.001000	.000300	....	....	
7,000	35,000	.001200	.000200	0.	....	
8,000	40,000	.001400	.000200	....	....	
8,400	42,000	.001450	.000050	0.	....	
8,600	43,000	.001450	0.	....	....	
8,800	44.000	.001500	.000050	....	....	
9,000	45,000	.001500	0.	....	....	
9,200	46,000	.001550	.000050	....	....	
9,400	47,000	.001600	.000050	....	....	
9,600	48,000	.001600	0.	....	....	
9,800	49,000	.001650	.000050	....	....	
10,000	50,000	.001700	.000050	....	....	
10,200	51,000	.001750	.000050	....	....	
10,400	52,000	.001800	.000050	....	....	
10,600	53,000	.001850	.000050	....	....	
10,800	54,000	.001900	.000050	....	....	
11,000	55,000	.001950	.000050	....	....	Elastic limit.
11,200	56,000	.002600	.000650	....	....	
11,400	57,000	.003200	.000600	....	....	
11,600	58,000	.004000	.000800	....	....	
11,800	59,000	.006000	.002000	....	....	
12,000	60,000	.007750	.001750	....	....	
18,680	93,400	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	93,400
Elastic limit per square inch of original section	do...	55,000
Elongation per inch after rupture	inch..	.1900
Elongation per inch under strain at elastic limit	do...	.001950
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		40.3
Position of rupture		″.4 from neck
Character of broken surface		silky, 40 per cent; granular at circumference, 60 per cent
Elongation of inch sections		″.28*, ″.10

TUBE.

No. 5825.

Marks, $\overset{32\ \mathrm{R}\ 204\ \mathrm{T}}{\mathrm{M\ T\ M}}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000600	.000300	....	....	
6,000	30,000	.000950	.000350	....	....	
7,000	35,000	.001100	.000150	0.	....	
8,000	40,000	.001250	.000150	....	....	
8,400	42,000	.001300	.000050	0.	....	
8,600	43,000	.001350	.000050	....	....	
8,800	44,000	.001400	.000050	....	....	
9,000	45,000	.001450	.000050	....	....	
9,200	46,000	.001500	.000050	....	....	
9,400	47,000	.001500	0.	....	....	
9,600	48,000	.001550	.000050	....	....	
9,800	49,000	.001550	0.	....	....	
10,000	50,000	.001600	.000050	....	....	
10,200	51,000	.001650	.000050	....	....	
10,400	52,000	.001700	.000050	....	....	
10,600	53,000	.001700	0.	....	....	
10,800	54,000	.001750	.000050	....	....	Elastic limit.
11,000	55,000	.004400	.002650	....	....	
11,200	56,000	.006500	.002100	....	....	
11,400	57,000	.010000	.003500	....	....	
11,600	58,000	.010500	.000500	....	....	
11,800	59,000	.011250	.000750	....	....	
17,970	89,850	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,850
Elastic limit per square inch of original section	do...	54,000
Elongation per inch after rupture	inch..	.2550
Elongation per inch under strain at elastic limit	do...	.001750
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		″.8 from neck
Character of broken surface		silky
Elongation of inch sections		″.18, ″.88*

TUBE.

No. 5826.

Marks, $\frac{\text{82 R 205 T}}{\text{M T, M}}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	.0	.0	Initial load.
1, 000	5, 000	.000100	.000100	.0	....	
2. 000	10, 000	.000350	.000250	....	....	
4, 000	20. 000	.000650	.000300	....	....	
6, 000	30, 000	.001000	.000350	....	....	
7, 000	85, 000	.001150	.000150	....	....	
8, 000	40, 000	.001300	.000150	0.	....	
8, 400	42, 000	.001400	.000100	....	....	
8, 600	43, 000	.001450	.000050	0.	....	
8, 800	44, 000	.001500	.000050	....	....	
9, 000	45, 000	.001500	0.	....	....	
9, 200	46, 000	.001550	.000050	....	....	
9, 400	47, 000	.001550	0.	....	....	
9, 600	48, 000	.001600	.000050	....	....	
9, 800	49, 000	.001600	0.	....	....	
10, 000	50, 000	.001650	.000050	....	....	
10, 200	51, 000	.001700	.000050	....	....	
10, 400	52, 000	.001750	.000050	....	....	
10, 600	53, 000	.001850	.000100	....	....	
10, 800	54, 000	.001950	.000100	....	....	Elastic limit.
11, 000	55. 000	.014250	.012300	....	....	
11, 200	56, 000	.015000	.000750	....	....	
11, 400	57, 000	.016050	.001050	....	....	
11, 600	58, 000	.017050	.001000	....	....	
11, 800	59, 000	.018250	.001200	....	....	
17, 020	85, 100	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section..................pounds..	85, 100
Elastic limit per square inch of original section..................do...	54, 000
Elongation per inch after rupture..................inch..	.2600
Elongation per inch under strain at elastic limit..................do...	.001950
Reduction in diameter at point of rupture..................do...	.155
Reduction in area after rupture, per cent of original section..................	51.9
Position of rupture..................	1 ″.1 from neck
Character of broken surface..................	silky
Elongation of inch sections..................	″.13, ″.36*

TUBE.

No. 5827.

Marks, $^{32\,\mathrm{R}\,207\,\mathrm{T}}_{\mathrm{M}\,\mathrm{T}_1\,\mathrm{M}}$
Diameter, ''.505.
Sectional area, .20 square inch.
Gauged length, 2''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	. 000100	. 000100	0.	....	
2, 000	10, 000	. 000300	. 000200	....	....	
4, 000	20, 000	. 000600	. 000300	....	....	
6, 000	30, 000	. 000950	. 000350	....	....	
7, 000	35, 000	. 001150	. 000200	0.	....	
8, 000	40, 000	. 001300	. 000150	....	....	
8, 400	42, 000	. 001400	. 000100	0.	....	
8, 600	43, 000	. 001450	. 000050	....	....	
8, 800	44, 000	. 001500	. 000050	....	....	
9, 000	45, 000	. 001550	. 000050	....	....	
9, 200	46, 000	. 001550	0.	....	....	
9, 400	47, 000	. 001600	. 000030	....	....	
9, 600	48, 000	. 001600	0.	....	....	
9, 800	49, 000	. 001650	. 000050	....	....	
10, 000	50, 000	. 001650	0.	....	....	
10, 200	51, 000	. 001700	. 000050	....	....	
10, 400	52, 000	. 001750	. 000050	....	....	
10, 600	53, 000	. 001800	. 000050	....	....	
10, 800	54, 000	. 001850	. 000050	....	....	
11, 000	55, 000	. 001900	. 000050	....	....	
11, 200	56, 000	. 001950	. 000050	....	....	Elastic limit.
11, 400	57, 000	. 005000	. 003050	....	....	
11, 600	58, 000	. 009050	. 004050	....	....	
11, 800	59, 000	. 010250	. 001200	....	....	
12, 000	60, 000	. 011100	. 000850	....	....	
12, 200	61, 000	. 012100	. 001000	....	....	
18, 790	93, 950	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	93, 950
Elastic limit per square inch of original section	do...	56, 000
Elongation per inch after rupture	inch..	. 2400
Elongation per inch under strain at elastic limit	do...	. 001950
Reduction in diameter at point of rupture	do...	. 135
Reduction in area after rupture, per cent of original section		46. 2
Position of rupture		1'' from neck
Character of broken surface		silky
Elongation of inch sections		''.30*. ''.18

TUBE.

No. 5828.

Marks, $^{32\ R\ 208\ T}_{M\ T,\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000350	.000250	....	....	
4,000	20,000	.000600	.000250	....	....	
6,000	30,000	.000950	.000350	....	....	
7,000	35,000	.001100	.000150	0.	....	
8,000	40,000	.001300	.000200	....	....	
8,400	42,000	.001350	.000050	0.	....	
8.000	43,000	.001400	.000050	....	....	
8,800	44,000	.001400	0.	....	....	
9,000	45.000	.001450	.000050	....	....	
9,200	46,000	.001500	.000050	....	....	
9,400	47,000	.001500	0.	....	....	
9,600	48,000	.001550	.000050	....	....	
9,800	49,000	.001550	0.	....	....	
10,000	50,000	.001600	.000050	....	....	
10,200	51,000	.001650	.000050	....	....	
10,400	52,000	.001700	.000050	....	....	
10,600	53,000	.001750	.000050	....	....	
10,800	54.000	.001800	.000050	....	....	
11,000	55,000	.001850	.000050	....	....	
11,200	56.000	.001850	0.	....	....	
11,400	57,000	.001900	.000050	....	....	
11,600	58,000	.001950	.000050	....	....	
11,800	59,000	.002000	.000050	....	....	Elastic limit.
12,000	60,000	.005250	.003250	....	....	
12,200	61,000	.008800	.003550	....	....	
12,400	62,000	.009350	.000550	....	....	
12,600	63,000	.010150	.000800	....	....	
12,800	64,000	.011250	.001100	....	....	
19,060	95,300	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	95,300
Elastic limit per square inch of original section	do...	59,000
Elongation per inch after rupture	inch..	.1400
Elongation per inch under strain at elastic limit	do...	.002000
Reduction in diameter at point of rupture	do...	.045
Reduction in area after rupture, per cent of original section		16.9
Position of rupture		″.95 from neck
Character of broken surface		granular, radiating from a spot in the circumference
Elongation of inch sections		″.15*, ″.13

TUBE.

No. 5839.

Marks, $^{32\ R\ 209\ T}_{M\ T_1\ M}$
Diameter, ''.505.
Sectional area, .20 square inch.
Gauged length, 2''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000150	.000150	0.	....	
2, 000	10, 000	.000350	.000200	....	....	
4, 000	20, 000	.000650	.000300	....	....	
6, 000	30, 000	.001000	.000350	....	....	
7, 000	85, 000	.001200	.000200	0.	....	
8, 000	40, 000	.001450	.000250	....	....	
8, 400	42, 000	.001500	.000050	0.	....	
8, 600	43, 000	.001550	.000050	....	....	
8, 800	44, 000	.001550	0.	....	....	
9, 000	45, 000	.001600	.000050	....	....	
9, 200	46, 000	.001650	.000050	....	....	
9, 400	47, 000	.001650	0.	....	....	
9, 600	48, 000	.001700	.000050	....	....	
9, 800	49, 000	.001750	.000050	....	....	
10, 000	50, 000	.001750	0.	....	....	
10, 200	51, 000	.001800	.000050	....	....	
10, 400	52, 000	.001850	.000050	....	....	
10, 600	53, 000	.001900	.000050	....	....	
10, 800	54, 000	.001950	.000050	....	....	
11, 000	55, 000	.002000	.000050	....	....	
11, 200	56, 000	.002000	0.	....	....	
11, 400	57, 000	.002050	.000050	....	....	
11, 600	58, 000	.002100	.000050	....	....	Elastic limit.
11, 800	59, 000	.003000	.000900	....	....	
12, 000	60, 000	.003900	.000900	....	....	
12, 200	61, 000	.007050	.003150	....	....	
12, 400	62, 000	.008550	.001500	....	....	
12, 600	63, 000	.009550	.001000	....	....	
19, 100	95, 500	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	95, 500
Elastic limit per square inch of original section	do...	58, 000
Elongation per inch after rupture	inch..	.2250
Elongation per inch under strain at elastic limit	do...	.002100
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		48.3
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		''.27*, ''.18

TUBE.

No. 5840.

Marks, $^{32\text{ R }210\text{ T}}_{\text{B T}_2\text{ M}}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000350	.000250	....	....	
4,000	20,000	.000650	.000300	....	....	
6,000	30,000	.001000	.000350	....	....	
7,000	35,000	.001200	.000200	0.	....	
8,000	40,000	.001500	.000300	....	....	
8,200	41,000	.001550	.000050	....	....	Elastic limit.
8,400	42,000	.004500	.002950	....	....	
8,600	43,000	.008100	.003600	....	....	
8,800	44,000	.009400	.001300	....	....	
9,000	45,000	.010250	.000850	....	....	
9,200	46.000	.011100	.000850	....	....	
16,470	82,350	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	82,350
Elastic limit per square inch of original section....do...	41,000
Elongation per inch after rupture....inch..	.2800
Elongation per inch under strain at elastic limit....do...	.001550
Reduction in diameter at point of rupture....do...	.125
Reduction in area after rupture, per cent of original section	43.3
Position of rupture	at middle of stem
Character of broken surface	silky, oblique
Elongation of inch sections....	″.26, ″.30*

TUBE.

No. 5841.

Marks, $\frac{32\ R\ 213\ T}{M\ T,\ M}$
Diameter, ″.505.
Sectional aréa, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000350	.000250	....	....	
4,000	20,000	.000650	.000300	....	....	
6,000	30,000	.001000	.000350	....	....	
7,000	35,000	.001150	.000150	0.	....	
8,000	40,000	.001350	.000200	....	....	
8,400	42,000	.001450	.000100	0.	....	
8,600	43,000	.001500	.000050	....	....	
8,800	44,000	.001500	0.	....	....	
9,000	45,000	.001550	.000050	....	....	
9,200	46,000	.001600	.000050	....	....	
9,400	47,000	.001600	0.	....	....	
9,600	48,000	.001650	.000050	....	....	
9,800	49,000	.001700	.000050	....	....	
10,000	50,000	.001700	0.	....	....	
10,200	51,000	.001750	.000050	....	....	
10,400	52,000	.001800	.000050	....	....	
10,600	53,000	.001850	.000050	....	....	
10,800	54,000	.001900	.000050	....	....	
11,000	55,000	.001950	.000050	....	....	Elastic limit.
11,200	56,000	.002400	.000450	....	....	
11,400	57,000	.003000	.000600	....	....	
11,600	58,000	.004400	.001400	....	....	
11,800	59,000	.006000	.001600	....	....	
12,000	60,000	.007100	.001100	....	....	
19,410	97,050	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds..	97,050
Elastic limit per square inch of original section .... do...	55,000
Elongation per inch after rupture .... inch..	.1950
Elongation per inch under strain at elastic limit .... do...	.001950
Reduction in diameter at point of rupture .... do...	.125
Reduction in area after rupture, per cent of original section	43.3
Postion of rupture	″.9 from neck
Character of broken surface	silky
Elongation of inch sections	″.10, ″.29*

TUBE.

No. 5829.

Marks, $\frac{\text{32 R 214 T}}{\text{B T, M}}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000600	.000300	....	....	
6,000	30,000	.000900	.000300	....	....	
7,000	35,000	.001100	.000200	0.	....	
8,000	40,000	.001200	.000100	....	....	
8,400	42,000	.001300	.000100	0.	....	
8,600	43,000	.001350	.000050	....	....	
8,800	44,000	.001350	0.	....	....	
9,000	45,000	.001400	.000050	....	....	
9,200	46,000	.001450	.000050	....	....	
9,400	47,000	.001500	.000050	....	....	
9,600	48,000	.001550	.000050	....	....	
9,800	49,000	.001600	.000050	....	....	
10,000	50,000	.001600	0.	....	....	
10,200	51,000	.001650	.000050	....	....	
10,400	52,000	.001700	.000050	....	....	Elastic limit.
10,600	53,000	.002100	.000400	....	....	
10,800	54,000	.002550	.000450	....	....	
11,000	55,000	.002850	.000300	....	....	
11,200	56,000	.003500	.000650	....	....	
11,400	57,000	.004300	.000800	....	....	
19,020	95,100	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	95,100
Elastic limit per square inch of original section	do...	52,000
Elongation per inch after rupture	inch..	.1700
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per cent of original section		30.7
Position of rupture		″.6 from neck
Character of broken surface		granular, 70 per cent; silky belt across fractured surface, 30 per cent
Elongation of inch sections		″.27, ″.07

TUBE.

No. 5830.

Marks, $\begin{smallmatrix}32 & \mathrm{R},_{16} & \mathrm{T}\\ \mathrm{B} & \mathrm{T}, & \underline{\mathrm{M}}\end{smallmatrix}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000400	.000300	....	....	
4,000	20,000	.000650	.000250	....	....	
6,000	30,000	.001000	.000350	....	....	
7,000	35,000	.001150	.000150	0.	....	
8,000	40,000	.001350	.000200	....	....	
8,400	42,000	.001400	.000050	0.	....	
8,600	43,000	.001450	.000050	....	....	
8,800	44,000	.001500	.000050	....	....	
9,000	45,000	.001500	0.	....	....	
9,200	46,000	.001550	.000050	....	....	
9,400	47,000	.001600	.000050	....	....	
9,600	48,000	.001600	0.	....	....	
9,800	49,000	.001650	.000050	....	....	
10,000	50,000	.001700	.000050	....	....	
10,200	51,000	.001750	.000050	....	....	
10,400	52,000	.001800	.000050	....	....	Elastic limit.
10,600	53,000	.001950	.000150	....	....	
10,800	54,000	.002300	.000350	....	....	
11,000	55,000	.002800	.000500	....	....	
11,200	56,000	.004300	.001500	....	....	
11,400	57,000	.005150	.000850	....	....	
19,260	96,300	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section..........pounds..	96,300
Elastic limit per square inch of original section..........do...	52,000
Elongation per inch after rupture..........inch..	.2100
Elongation per inch under strain at elastic limit..........do...	.001800
Reduction in diameter at point of rupture..........do...	.115
Reduction in area after rupture, per cent of original section..........	40.3
Position of rupture..........	″.75 from neck
Character of broken surface..........	granular at circumference, 50 per cent; silky center, 50 per cent
Elongation of inch sections..........	″.28*, ″.14

TUBE.

No. 5852.

Marks, $\frac{82}{\text{M}}\,\frac{\text{R}_{27}}{\text{T}},\frac{\text{T}}{\text{M}}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000600	.000300	....	....	
6,000	30,000	.001000	.000400	....	....	
7,000	35,000	.001150	.000150	0.	....	
8,000	40,000	.001350	.000200	....	....	
8,400	42,000	.001450	.000100	0.	....	
8,600	43,000	.001500	.000050	....	....	
8,800	44,000	.001500	0.	....	....	
9,000	45,000	.001550	.000050	....	....	
9,200	46,000	.001600	.000050	....	....	Elastic limit.
9,400	47,000	.002500	.000900	....	....	
9,600	48,000	.011800	.009300	....	....	
9,800	49,000	.012200	.000400	....	....	
10,000	50,000	.012900	.000700	....	....	
10,200	51,000	.013850	.000950	....	....	
16,590	82,950	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	82,950
Elastic limit per square inch of original section	do...	46,000
Elongation per inch after rupture	inch..	.2500
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		1″ from neck
Character of broken surface		silky
Elongation of inch sections		″.33*, ″.17

TUBE.

No. 5853.

Marks, $\overset{32\ \mathrm{R}\ 229\ \mathrm{T}}{\mathrm{B\ T_1\ M}}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	....	....	
2,000	10,000	.000350	.000200	....	....	
4,000	20,000	.000700	.000350	....	....	
6,000	30,000	.001050	.000350	....	....	
7,000	35,000	.001250	.000200	.000050	.000050	
8,000	40,000	.001400	.000150	....	....	
8,400	42,000	.001500	.000100	.000100	.000050	
8,600	43,000	.001550	.000050	....	....	
8,800	44,000	.001600	.000050	....	....	
9,000	45,000	.001600	0.	....	....	
9,200	46,000	.001650	.000050	....	....	
9,400	47,000	.001700	.000050	....	....	
9,600	48,000	.001750	.000050	....	....	
9,800	49,000	.001800	.000050	....	....	
10,000	50,000	.001850	.000050	....	....	
10,200	51,000	.001850	0.	....	....	
10,400	52,000	.001900	.000050	....	....	
10,600	53,000	.002000	.000100	....	....	
10,800	54,000	.002050	.000050	....	....	Elastic limit.
11,000	55,000	.002200	.000150	....	....	
11,200	56,000	.002500	.000300	....	....	
11,400	57,000	.003250	.000750	....	....	
11,600	58,000	.005000	.001750	....	....	
11,800	59,000	.006650	.001650	....	....	
19,080	95,400	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	95,400
Elastic limit per square inch of original section	do....	54,000
Elongation per inch after rupture	inch..	.1750
Elongation per inch under strain at elastic limit	do....	.002050
Reduction in diameter at point of rupture	do....	.075
Reduction in area after rupture, per cent of original section		27.4
Position of rupture		″.7 from neck
Character of broken surface		granular, flaky spot at the circumference
Elongation of inch sections		″.12 ″.23*

JACKET.

No. 5774.

Marks, $^{\text{32 R 182 J}}_{\text{M T, O}}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000350	.000250	....	....	
4,000	20,000	.000700	.000350	....	....	
6,000	30,000	.001050	.000350	....	....	
8,000	40,000	.001450	.000400	0.	....	
9,200	46,000	.001650	.000200	0.	....	
9,400	47,000	.001700	.000050	....	....	
9,600	48,000	.001750	.000050	....	....	
9,800	49,000	.001800	.000050	....	....	
10,000	50,000	.001850	.000050	....	....	
10,200	51,000	.001900	.000050	....	....	
10,400	52,000	.001950	.000050	....	....	
10,600	53,000	.002000	.000050	....	....	
10,800	54,000	.002100	.000100	....	....	Elastic limit.
11,000	55,000	.002450	.000350	....	....	
11,200	56,000	.002850	.000400	....	....	
11,400	57,000	.003550	.000700	....	....	
11,600	58,000	.004500	.000950	....	....	
11,800	59,000	.005500	.001000	....	....	
20,040	100,200	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	100,200
Elastic limit per square inch of original section	do....	54,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do....	.002100
Reduction in diameter at point of rupture	do....	.095
Reduction in area after rupture, per cent of original section		34.0
Position of rupture		1″.1 from neck
Character of broken surface		granular, radiating from a silky spot in the circumference
Elongation of inch sections		″.19, ″.23*

JACKET.

No. 5775.

Marks, $\genfrac{}{}{0pt}{}{\text{32 R 185 J}}{\text{M T, O}}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000100	.000100	0.	....	
2, 000	10, 000	.000300	.000200	....	....	
4, 000	20, 000	.000650	.000350	....	....	
6, 000	30, 000	.000950	.000300	....	....	
8, 000	40, 000	.001350	.000400	0.	....	
9, 200	46, 000	.001600	.000250	.000050	.000050	
9, 400	47, 000	.001650	.000050	....	....	
9, 600	48, 000	.001700	.000050	....	....	
9, 800	49, 000	.001750	.000050	....	....	
10, 000	50, 000	.001800	.000050	....	....	
10, 200	51, 000	.001850	.000050	....	....	
10, 400	52, 000	.001900	.000050	....	....	
10, 600	53, 000	.002000	.000100	....	....	Elastic limit.
10, 800	54, 000	.002250	.000250	....	....	
11, 000	55, 000	.002800	.000550	....	....	
11, 200	56, 000	.003600	.000800	....	....	
11, 400	57, 000	.004600	.001000	....	....	
11, 600	58, 000	.005250	.000650	....	....	
19, 930	99, 650	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	99, 650
Elastic limit per square inch of original section	do...	53. 000
Elongation per inch after rupture	inch..	.1950
Elongation per inch under strain at elastic limit	do...	.002000
Reduction in diameter at point of rupture	do...	.095
Reduction in area after rupture, per cent of original section		34.0
Position of rupture		″.95 from neck
Character of broken surface		granular, radiating from a silky spot in the circumference
Elogation of inch sections		″.12, ″.27*

JACKET.

No. 5770.

Marks, $\substack{\text{32 R 186 J}\\ \text{M T, O}}$
Diameter, ''.505.
Sectional area, .20 square inch.
Gauged length, 2''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000100	.000100	0.		
2, 000	10, 600	.000350	.000250			
4, 000	20, 000	.000700	.000350			
6, 000	80, 000	.001050	.000350			
8, 000	40, 000	.001400	.000350	0.		
9, 200	46, 000	.001600	.000200	.000050	.000050	
9, 400	47, 000	.001650	.000050			
9, 600	48, 000	.001700	.000050			
9, 800	49, 000	.001750	.000050			
10, 000	50, 000	.001850	.000100			
10, 200	51, 000	.001900	.000050			
10, 400	52, 000	.001950	.000050			
10, 600	53, 000	.002000	.000050			
10, 800	54, 000	.002050	.000050			
11, 000	55, 000	.002100	.000050			Elastic limit.
11, 200	56, 000	.002350	.000250			
11, 400	57, 000	.002900	.000550			
11, 600	58. 000	.004000	.001100			
11, 800	59, 000	.004850	.000850			
12, 000	60, 000	.005700	.000850			
20, 960	104, 800					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	104, 800
Elastic limit per square inch of original section	do...	55, 000
Elongation per inch after rupture	inch..	.1900
Elongation per inch under strain at elastic limit	do...	.002100
Reduction in diameter at point of rupture	do...	.095
Reduction in area after rupture, per cent of original section		34.0
Position of rupture		1.''1 from neck
Character of broken surface		granular, 60 per cent; silky, 40 per cent
Elongation of inch sections		.''20*, .''18

JACKET.

No. 5771.

Marks, $\substack{\text{32 R 187 J}\\ \text{M T, O}}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.			Initial load.
1,000	5,000	.000150	.000150	0.	0.	
2,000	10,000	.000300	.000150	0.	....	
4,000	20,000	.000650	.000350	....	....	
6,000	30,000	.001000	.000350	....	....	
8,000	40,000	.001350	.000350	0.	....	
9,200	46,000	.001600	.000250	.000050	.000050	
9,400	47,000	.001650	.000050	....	....	
9,600	48,000	.001650	0.	....	....	
9,800	49,000	.001700	.000050	....	....	
10,000	50,000	.001750	.000050	....	....	
10,200	51,000	.001800	.000050	....	....	
10,400	52,000	.001850	.000050	....	....	
10,600	53,000	.001850	0.	....	....	
10,800	54,000	.001900	.000050	....	....	Elastic limit.
11,000	55,000	.002200	.000300	....	....	
11,200	56,000	.003500	.001300	....	....	
11,400	57,000	.005250	.001750	....	....	
11,600	58,000	.006250	.001000	....	....	
11,800	59,000	.007250	.001000	....	....	
19,510	97,550	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	97,550
Elastic limit per square inch of original section	do...	54,000
Elongation per inch after rupture	inch..	.2300
Elongation per inch under strain at elastic limit	do...	.001900
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		37.1
Position of rupture		1″.2 from neck
Character of broken surface		granular, 70 per cent; silky, 30 per cent
Elongation of inch sections		″.25*, ″.21

JACKET.

No. 5772.

Marks, $^{32\ \mathrm{R}\ 190\ \mathrm{J}}_{\mathrm{M}\ \mathrm{T},\ \mathrm{O}}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000650	.000350	....	....	
6,000	30,000	.001000	.000350	....	....	
8,000	40,000	.001400	.000400	0.	....	
9,200	46,000	.001600	.000200	0.	....	
9,400	47,000	.001650	.000050	....	....	
9,600	48,000	.001650	0.	....	....	
9,800	49,000	.001700	.000050	....	....	
10,000	50,000	.001750	.000050	....	....	
10,200	51,000	.001800	.000050	....	....	
10,400	52,000	.001850	.000050	....	....	
10,600	53,000	.001900	.000050	....	....	
10,800	54,000	.001950	.000050	....	....	
11,000	55,000	.002050	.000100	....	....	Elastic limit.
11,200	56,000	.002350	.000300	....	....	
11,400	57,000	.002700	.000350	....	....	
11,600	58,000	.003400	.000700	....	....	
11,800	59,000	.004250	.000850	....	....	
13,000	60,000	.005200	.000950	....	....	
20,920	104,600	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	104,600
Elastic limit per square inch of original section ....do...	55,000
Elongation per inch after rupture ....inch..	.1900
Elongation per inch under strain at elastic limit ....do...	.002050
Reduction in diameter at point of rupture ....do...	.055
Reduction in area after rupture, per cent of original section	20.5
Position of rupture	″.90 from neck
Character of broken surface	granular, radiating from a silky spot in the circumference. Opened crack in surface of stem near place of rupture.
Elongation of inch sections	″.19, ″.19*

JACKET.

No. 5789.

Marks, 32 R 191 J
M T, O
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	....	
2,000	10,000	.000350	.000200	....	....	
4,000	20,000	.000600	.000250	....	....	
6,000	30,000	.000950	.000350	....	....	
8,000	40,000	.001300	.000350	0.	....	
9,200	46,000	.001450	.000150	0.	....	
9,400	47,000	.001500	.000050	....	....	
9,600	48,000	.001550	.000050	....	....	
9,800	49,000	.001550	0.	....	....	
10,000	50,000	.001600	.000050	....	....	
10,200	51,000	.001650	.000050	....	....	
10,400	52,000	.001700	.000050	....	....	
10,600	53,000	.001750	.000050	....	....	Elastic limit.
10,800	54,000	.002900	.001150	....	....	
11,000	55,000	.005500	.002600	....	....	
11,200	56,000	.006750	.001250	....	....	
11,400	57,000	.007500	.000750	....	....	
11,600	58,000	.008150	.000650	....	....	
19,210	96,050	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	96,050
Elastic limit per square inch of original section	do...	53,000
Elongation per inch after rupture	inch..	.2200
Elongation per inch under strain at elastic limit	do...	.001750
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.0
Position of rupture		″.80 from neck
Character of broken surface		silky
Elongation of inch sections		″.32*, ″.12

JACKET.

No. 5790.

Marks, $\substack{\text{32 R 193 J}\\ \text{M T, O}}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2.″

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000600	.000300	....	....	
6,000	80,000	.000950	.000350	....	....	
8,000	40,000	.001250	.000300	0.	....	
9,200	46,000	.001450	.000200	0.	....	
9,400	47,000	.001500	.000050	....	....	
9,600	48,000	.001550	.000050	....	....	
9,800	49,000	.001600	.000050	....	....	Elastic limit.
10,000	50,000	.005000	.003400	....	....	
10,200	51,000	.005550	.000550	....	....	
10,400	52,000	.006050	.000500	....	....	
10,600	53,000	.007100	.001050	....	....	
10,800	54,000	.008050	.000950	....	....	
18,390	91,950	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	91,950
Elastic limit per square inch of original section	do...	49,000
Elongation per inch after rupture	inch..	.2200
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		37.1
Position of rupture		1″ from neck
Character of broken surface		granular, 55 per cent; silky, 45 per cent
Elongation of inch sections		″.15, ″.29*

JACKET.

No. 5791.

Marks, $^{32\ R\ 194\ J}_{M\ T_2\ M}$
Diameter, ″.508.
Sectional area, .203 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
203	1,000	0.	0.	0.	0.	Initial load.
1,015	5,000	.000150	.000150	0.	....	
2,030	10,000	.000300	.000150	....	....	
4,060	20,000	.000600	.000300	....	....	
6,090	30,000	.000900	.000300	....	....	
8,120	40,000	.001200	.000300	0.	....	
9,338	46,000	.001450	.000250	0.	....	
9,541	47,000	.001500	.000050	....	....	
9,744	48,000	.001550	.000050	....	....	
9,947	49,000	.001600	.000050	....	....	
10,150	50,000	.001600	0.	....	....	
10,353	51 000	.001650	.000050	....	....	
10,556	52,000	.001700	.000050	....	....	
10,759	53,000	.001700	0.	....	....	
10,962	54,000	.001750	.000050	....	....	
11,165	55,000	.001800	.000050	....	....	Elastic limit.
11,368	56,000	.002030	.000250	....	....	
11,571	57,000	.002900	.000850	....	....	
11,774	58,000	.004500	.001600	....	....	
11,977	59,000	.005550	.001050	....	....	
12,180	60,000	.007000	.001450	....	....	
19,880	97,930	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	97,930
Elastic limit per square inch of original section	do...	55,000
Elongation per inch after rupture	inch..	.2200
Elongation per inch under strain at elastic limit	do...	.001800
Reduction in diameter at point of rupture	do...	.128
Reduction in area after rupture, per cent of original section		44.1
Position of rupture		″.8 from neck
Character of broken surface		silky
Elongation of inch sections		″.33*, ″.11

JACKET.

No. 5792.

Marks, $\genfrac{}{}{0pt}{}{32\ \mathrm{R}\ 195\ \mathrm{J}}{\mathrm{M\ T,\ O}}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length 2″.
Defective specimen, stem and threaded ends not in line.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000250	.000250	0.	....	
2,000	10,000	.000600	.000350	....	....	
4,000	20,000	.000950	.000350	....	....	
6,000	30,000	.001300	.000350	....	....	
8,000	40,000	.001550	.000250	.000100	.000100	
8,800	44,000	....	....	....	....	Elastic limit, approximate.
9,200	46,000	.009100	.007550	.007400	.007300	
9,400	47,000	.009900	.000800	....	....	
9,600	48,000	.010850	.000950	....	....	
9,800	49,000	.011950	.001100	....	....	
10,000	50,000	.013250	.001300	....	....	
17,190	85,950	....	....	....	....	Tensile strength.

Genaral summary.

Tensile strength per square inch of original section	pounds..	85,950
Elastic limit per square inch of original section, approximate	do...	44,000
Elongation per inch after rupture	inch..	.2200
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		37.1
Position of rupture		″.95 from neck
Character of broken surface		granular, radiating from a silky spot on one side of stem. Opened cracks along cylindrical surface.
Elongation of inch sections		″.12, ″.32*

JACKET.

No. 5798.

Marks, $^{32\ R\ 196\ J}_{M\ T,\ O}$

Diameter, ″.505.

Sectional area, .20 square inch.

Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000250	.000150	....	....	
4,000	20,000	.000550	.000300	....	....	
6,000	30,000	.000950	.000400	....	....	
8,000	40,000	.001350	.000400	0.	....	
9,200	46,000	.001550	.000200	0.	....	
9,400	47,000	.001600	.000050	....	....	
9,600	48,000	.001650	.000050	....	....	
9,800	49,000	.001650	0.	....	....	
10,000	50,000	.001750	.000100	....	....	
10,200	51,000	.001750	0.	....	....	
10,400	52,000	.001850	.000100	....	....	
10,600	53,000	.001900	.000050	....	....	
10,800	54,000	.001950	.000050	....	....	Elastic limit.
11,000	55,000	.002100	.000150	....	....	
11,200	56,000	.002850	.000750	....	....	
11,400	57,000	.003400	.000550	....	....	
11,600	58,000	.004650	.001250	....	....	
11,800	59,000	.005550	.000900	....	....	
12,000	60,000	.006500	.000950	....	....	
19,620	98,100	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	98,100
Elastic limit per square inch of original section	do...	54,000
Elongation per inch after rupture	inch..	.2400
Elongation per inch under strain at elastic limit	do...	.001950
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		48.3
Position of rupture		″.80 from neck
Character of broken surface		silky 40 per cent, granular at circumference 60 per cent
Elongation of inch sections		″.14, ″.34*

JACKET.

No. 5799.

Marks, $\begin{smallmatrix}82\text{ R }197\text{ J}\\ \text{M T, O}\end{smallmatrix}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	0.	
2,000	10,000	.000300	.000200			
4,000	20,000	.000600	.000300			
6,000	30.000	.001000	.000400			
8,000	40,000	.001350	.000350	0.		
9,200	46.000	.001550	.000200	0.		
9,400	47.000	.001600	.000050			
9,600	48,000	.001650	.000050			
9,800	49,000	.001700	.000050			
10,000	50,000	.001700	0.			
10,200	51,000	.001750	.000050			
10,400	52,000	.001800	.000050			Elastic limit.
10,600	53,000	.001950	.000150			
10,800	54,000	.002550	.000600			
11,000	55,000	.003900	.001350			
11,200	56,000	.004850	.000950			
11,400	57,000	.005950	.001100			
11,600	58,000	.006800	.000850			
19,380	96,900					Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	96,900
Elastic limit per square inch of original section........do...	52,000
Elongation per inch after rupture ....inch..	.2200
Elongation per inch under strain at elastic limit........do...	.001800
Reduction in diameter at point of rupture........do...	.115
Reduction in area after rupture, per cent of original section........	40.3
Position of rupture	″.95 from neck
Character of broken surface	granular 75 per cent, silky 25 per cent
Elongation of inch sections........	″.31*, ″.13

JACKET.

No. 5800.

Marks, $^{32\ R\ 198\ J}_{M\ T,\ O}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	....	
2,000	10,000	.000350	.000200	....	....	
4,000	20,000	.000700	.000350	....	....	
6,000	30,000	.001100	.000400	....	....	
8,000	40,000	.001500	.000400	0.	....	
9,200	46,000	.001700	.000200	0.	....	
9,400	47,000	.001700	0.	....	....	
9,600	48,000	.001750	.000050	....	....	
9,800	49,000	.001850	.000100	....	....	
10,000	50,000	.001900	.000050	....	....	
10,200	51,000	.001950	.000050	....	....	Elastic limit.
10,400	52,000	.002150	.000200	....	....	
10,600	53,000	.004200	.002050	....	....	
10,800	54,000	.005000	.000800	....	....	
11,000	55,000	.005850	.000850	....	....	
11,200	56,600	.006700	.000850	....	....	
18,820	94,100	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	94,100
Elastic limit per square inch of original section ....do...	51,000
Elongation per inch after rupture..inch..	.2300
Elongation per inch under strain at elastic limit ....do...	.001950
Reduction in diameter at point of rupture ....do...	.135
Reduction in area after rupture, per cent of original section..	46.2
Position of rupture..	at middle of stem
Character of broken surface..	silky
Elongation of inch sections	″.21*, ″.25*

JACKET.

No. 5801.

Marks, 32 R 199 J M T, O
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.		
2,000	10,000	.000250	.000150			
4,000	20,000	.000550	.000300			
6,000	30,000	.000900	.000350			
8,000	40,000	.001250	.000350	0.		
9,200	46,000	.001500	.000250	0.		
9,400	47,000	.001550	.000050			
9,600	48,000	.001550	0.			
9,800	49,000	.001600	.000050			
10,000	50,000	.001650	.000050			
10,200	51,000	.001700	.000050			Elastic limit.
10,400	52,000	.002700	.001000			
10,600	53,000	.003650	.000950			
10,800	54,000	.005200	.001550			
11,000	55,000	.006000	.000800			
11,200	56,000	.006950	.000950			
18,880	94,400					Tensile strength.

General summary.

Tensile strength per square inch of original section....pounds..	94,400
Elastic limit per square inch of original section....do...	51,000
Elongation per inch after rupture....inch..	.2450
Elongation per inch under strain at elastic limit....do...	.001700
Reduction in diameter at point of rupture....do...	.135
Reduction in area after rupture, per cent of original section....do...	46.2
Position of rupture....	at middle of stem
Character of broken surface....	silky
Elongation of inch sections....	″.23*, ″.26*

JACKET.

No. 5819.

Marks, $\genfrac{}{}{0pt}{}{82\ R\ 201\ J}{M\ T_1\ O}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	....	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000600	.000300	....	....	
6,000	30,000	.000950	.000350	....	....	
8,000	40,000	.001200	.000250	....	....	
9.200	46,000	.001400	.000200	....	....	
9,400	47,000	.001450	.000050	....	....	
9,600	48,000	.001450	0.	....	....	
9,800	49,000	.001500	.000050	....	....	
10,000	50,000	.001550	.000050	....	....	
10,200	51,000	.001550	0.	....	....	
10,400	52,000	.001600	.000050	....	....	
10,600	53,000	.001650	.000050	....	....	
10,800	54,000	.001700	.000050	....	....	
11,000	55,000	.001750	.000050	....	....	
11,200	56,000	.001750	0.	....	....	
11,400	57,000	.001800	.000050	....	....	Elastic limit.
11,600	58,000	.002100	.000300	....	....	
11.800	59,000	.003900	.001800	....	....	
12,000	60.000	.005000	.001100	....	....	
12.200	61,000	.006000	.001000	....	....	
12,400	62,000	.007650	.001650	....	....	
19,520	97,600	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	97,600
Elastic limit per square inch of original section	do...	57,000
Elongation per inch after rupture	inch..	.2050
Elongation per inch under strain at elastic limit	do...	.001800
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		37.1
Position of rupture		″.6 from neck
Character of broken surface		silky, 60 per cent; granular, 40 per cent. Opened cracks in surface of stem.
Elongation of inch sections		″.30*, ″.11

JACKET.

No. 5837.

Marks, $^{\text{32 R 203 J}}_{\text{M T, O}}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.		
2,000	10,000	.000300	.000200			
4,000	20,000	.000600	.000300			
6,000	30,000	.000950	.000350			
8,000	40,000	.001250	.000300	0.		
9,200	46,000	.001500	.000250	0.		
9,400	47,000	.001500	0.			
9,600	48,000	.001550	.000050			
9,800	49,000	.001600	.000050			
10,000	50,000	.001600	0.			
10,200	51,000	.001650	.000050			
10,400	52,000	.001700	.000050			
10,600	53,000	.001750	.000050			
10,800	54,000	.001750	0.			
11,000	55,000	.001850	.000100			Elastic limit.
11,200	56,000	.002000	.000150			
11,400	57,000	.002400	.000400			
11,600	58,000	.003050	.000650			
11,800	59,000	.004450	.001400			
12,000	60,000	.005200	.000750			
19,890	99,450					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	99,450
Elastic limit per square inch of original section	do...	55,000
Elongation per inch after rupture	inch..	.1800
Elongation per inch under strain at elastic limit	do...	.001850
Reduction in diameter at point of rupture	do...	.065
Reduction in area after rupture, per cent of original section		23.9
Position of rupture		″.2 from neck
Character of broken surface		granular, radiating from a flaky spot at circumference
Elongation of inch sections		″.26*, ″.10

JACKET.

No. 5838.

Marks, $^{32\ R\ 204\ J}_{M\ T_1\ O}$.
Diameter, ''.505.
Sectional area, .20 square inch.
Gauged length, 2''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000650	.000350	....	....	
6,000	30,000	.001000	.000350	....	....	
8,000	40,000	.001350	.000350	.000050	.000050	
9,200	46,000	.001650	.000300	.000100	.000050	
9,400	47,000	.001700	.000050	....	....	Elastic limit.
9,600	48,000	.011100	.009400	....	....	
9,800	49,000	.012000	.000900	....	....	
10,000	50,000	.012500	.000500	....	....	
10,200	51,000	.013500	.001000	....	....	
10,400	52,000	.014500	.001000	....	....	
17,410	87,050	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	87,050
Elastic limit per square inch of original section	do...	47,000
Elongation per inch after rupture	inch..	.2550
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		1'' from neck
Character of broken surface		fine silky
Elongation of inch sections		''.19, ''.32*

TABULATION OF TENSION SPECIMENS FROM 3.2-INCH B. L. STEEL FIELD GUNS (STEMS 2" LONG, ".505 DIAMETER).

No. of test.	Position in gun.	Location of specimens.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Remarks.
			Pounds.	*Pounds.*	*Pr. ct.*	*Pr. ct.*		
5820	Tube No. 197	Middle	56,000	92,550	21.0	43.3	Silky	Muzzle end.
5821	Tube No. 199	do	56,000	94,100	21.0	43.3	do	Do.
5822	Tube No. 200	do	41,000	81,450	24.5	46.2	do	Do.
5823	Tube No. 202	do	50,000	86,300	25.0	43.3	do	Do.
5824	Tube No. 203	do	55,000	93,400	19.0	40.3	Silky, 40 per cent granular, at circumference 60 per cent.	Do.
5825	Tube No. 204	do	54,000	89,850	25.5	46.2	Silky	Do.
5826	Tube No. 205	do	54,000	85,100	26.0	51.9	do	Do.
5827	Tube No. 207	do	56,000	93,950	24.0	46.2	do	Do.
5828	Tube No. 208	do	59,000	95,300	14.0	16.9	Granular, radiating from a spot in the circumference.	Do.
5839	Tube No. 209	do	58,000	95,500	22.5	43.3	Silky	Do.
5840	Tube No. 210	do	41,000	82,350	28.0	43.3	Silky, oblique	Breech end.
5841	Tube No. 213	do	55,000	97,050	19.5	43.3	Silky	Muzzle end.
5829	Tube No. 214	do	52,000	95,100	17.0	30.7	Granular, 70 per cent, silky, belt across fractured surface 30 per cent.	Breech end.
5830	Tube No. 216	do	52,000	96,300	21.0	40.3	Granular at the circumference 50 per cent, silky center 50 per cent.	Do.
5852	Tube No. 227	do	46,000	82,950	25.0	43.3	Silky	Muzzle end.
5853	Tube No. 229	do	54,000	95,400	17.5	27.4	Granular, flaky spot at the circumference.	Breech end.
5774	Jacket No. 182	Outside.	54,000	100,200	21.0	34.0	Granular, radiating from a silky spot in the circumference.	Muzzle end.
5775	Jacket No. 185	do	53,000	99,650	19.5	34.0	Granular, radiating from a silky spot in circumference.	Do.
5770	Jacket No. 186	do	55,000	104,800	19.0	34.0	Granular 60 per cent, silky 40 per cent.	Do.
5771	Jacket No. 187	do	54,000	97,550	23.0	37.1	Granular 70 per cent, silky 30 per cent.	Do.
5772	Jacket No. 190	do	55,000	104,600	19.0	20.5	Granular, radiating from a silky spot in the circumference.	Do.
5789	Jacket No. 191	do	53,000	96,050	22.0	43.3	Silky	Do.
5790	Jacket No. 193	do	49,000	91,950	22.0	37.1	Granular 55 per cent, silky 45 per cent.	Do.
5791	Jacket No. 194	Middle	55,000	97,930	22.0	44.1	Silky	Do.
5792	Jacket No. 195	Outside.	[a]44,000	85,950	22.0	37.1	Granular, radiating from a silky spot on one side of stem.	Do.
5798	Jacket No. 196	do	54,000	98,100	24.0	43.3	Silky 40 per cent, granular at circumference 60 per cent.	Do.
5799	Jacket No. 197	do	52,000	96,900	22.0	40.3	Granular 75 per cent, silky 25 per cent.	Do.
5800	Jacket No. 198	do	51,000	94,100	23.0	46.2	Silky	Do.
5801	Jacket No. 199	do	51,000	94,400	24.5	46.2	do	Do.
5819	Jacket No. 201	do	57,000	97,600	20.5	37.1	Silky 60 per cent, granular 40 per cent.	Do.
5837	Jacket No. 203	do	55,000	99,450	18.0	23.9	Granular, radiating from a flaky spot at circumference.	Do.
5838	Jacket No. 204	do	47,000	87,050	25.5	46.2	Fine silky	Do.

[a] Approximate.

3.6-INCH B. L. FIELD MORTARS.

SPECIMENS FROM BODIES, GAS CHECKS, AND BREECH BLOCKS.

BODY No. 1.

No. 5952.

Marks, $\overset{36\text{ M }R_1}{B_2}$
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000600	.000300	....	....	
6,000	30,000	.001000	.000400	....	....	
8,000	40,000	.001400	.000400	0.	....	
9,200	46,000	.001550	.000150	0.	....	
9,400	47,000	.001550	0.	....	....	
9,600	48,000	.001600	.000050	....	....	
9,800	49,000	.001650	.000050	....	....	
10,000	50,000	.001650	0.	....	....	
10.200	51,000	.001700	.000050	....	....	
10,400	52,000	.001800	.000100	....	....	
10,600	53,000	.001850	.000050	....	....	
10,800	54,000	.001900	.000050	....	....	
11,000	55,000	.002000	.000100	....	....	Elastic limit.
11,200	56,000	.003050	.001050	....	....	
11,400	57,000	.004950	.001900	....	....	
11,600	58,000	.006300	.001350	....	....	
11,800	59,000	.007250	.000950	....	....	
12,000	60,000	.008200	.000950	....	....	
18,510	92,550	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	92,550
Elastic limit per square inch of original section	do...	55,000
Elongation per inch after rupture	inch..	.1900
Elongation per inch under strain at elastic limit	do...	.002000
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per cent of original section		30.7
Position of rupture		1".1 from neck
Character of broken surface		granular 60 per cent, silky lamellar 40 per cent
Elongation of inch sections		".16, ".22*

BODY No. 3.

No. 5969.

Marks, $^{36\ \mathrm{M\ R_3}}_{\mathrm{B_3}}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	....	
2,000	10,000	.000400	.000250	....	....	
4,000	20,000	.000750	.000350	....	....	
6,000	30,000	.001050	.000300	....	....	
8,000	40,000	.001400	.000350	0.	....	
9,200	46,000	.001600	.000200	.000050	.000050	
9,400	47,000	.001850	.000250	....	....	
9,600	48,000	.001900	.000050	....	....	
9,800	49,000	.001950	.000050	....	....	
10,000	50,000	.001950	0.	....	....	
10,200	51,000	.002000	.000050	....	....	Elastic limit.
10,400	52,000	.002450	.000450	....	....	
10,600	53,000	.004450	.002000	....	....	
10,800	54,000	.006350	.001900	....	....	
11,000	55,000	.007200	.000850	....	....	
11,200	56,000	.007950	.000750	....	....	
18,090	90,450	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	90,450
Elastic limit per square inch of original section	do...	51,000
Elongation per inch after rupture	inch..	.2250
Elongation per inch under strain at elastic limit	do...	.002000
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		37.1
Position of rupture		.″7 from neck
Character of broken surface		granular 60 per cent; silky 40 per cent
Elongation of inch sections		″.14, ″.31*

GAS CHECKS.

Oil tempered at low cherry red, annealed at 850° F.

No. 5916.

Marks 36 M. R. GC.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000050	.000050	0.	....	
2,000	10,000	.000250	.000200	....	....	
6,000	30,000	.000850	.000600	....	....	
12,000	60,000	.001900	.001050	.000050	.000050	
14,000	70,000	.002200	.000300	.000050	0.	
14,200	71,000	.002300	.000100	....	....	
14,400	72,000	.002350	.000050	....	....	
14,600	73,000	.002400	.000050	....	....	
14,800	74,000	.002400	0.	....	....	
15,000	75,000	.002400+	.000000	....	....	
15,200	76,000	.002450	.000050	....	....	
15,400	77,000	.002500	.000050	....	....	
15,600	78,000	.002500	0.	....	....	
15,800	79,000	.002500+	.000000	....	....	
16,000	80,000	.002550	.000050	....	....	
16,200	81,000	.002600	.000050	....	....	Elastic limit.
16,400	82,000	.002800	.000200	....	....	
16,600	83,000	.003000	.000200	....	....	
16,800	84,000	.003900	.000900	....	....	
17,000	85,000	.004500	.000600	....	....	
27,620	138,100	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	138,100
Elastic limit per square inch of original section	do	81,000
Elongation per inch after rupture	inch	.1650
Elongation per inch under strain at elastic limit	do	.002600
Reduction in diameter at point of rupture	do	.085
Reduction in area after rupture, per cent of original section	do	30.7
Position of rupture		″.116 from neck
Character of broken surface		fine granular, radiating from center punch mark defining the inch sections on the stem.
Elongation of inch sections		″.17*, ″.16*

TABULATION OF TENSION SPECIMENS FROM 3.6-INCH B. L. FIELD MORTARS (STEMS 2″ LONG, ″.505 DIAMETER).

No. of test.	Position in gun.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	.Remarks.
		Pounds.	*Pounds.*	*Pr. ct.*	*Pr. ct.*		
5952	Body No. 1......	55,000	92,550	19.0	30.7	Granular 60 per cent, silky lamellar 40 per cent.	Breech end.
5969	Body No. 3......	51,000	90,450	22.5	37.1	Granular 60 per cent, silky 40 per cent.	Do.
5916	Gas checks	81,000	138,100	16.5	30.7	Fine granular, radiating from center punch mark defining the inch sections on the stem.	
9396	.....do	79,100	125,350	16.0	30.5	.....do	Tool steel.
9514	Breechblocks...	57,250	88,050	22.0	43.3	Silky	

5-INCH B. L. SIEGE RIFLES.

SPECIMENS FROM TUBES AND JACKETS.

TUBE.

No. 5723.

Marks, 8969 B, M T, M
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000100	.000100	0.	....	
2, 000	10, 000	.000300	.000200	....	....	
4, 000	20, 000	.000700	.000400	....	....	
6, 000	30, 000	.001050	.000350	....	....	
7, 000	35, 000	.001250	.000200	0.	....	
8, 000	40, 000	.001450	.000200	....	....	
8, 400	42, 000	.001500	.000050	.000050	.000050	
8, 600	43, 000	.001550	.000050	....	....	
8, 800	44, 000	.001550	0.	....	....	
9, 000	45, 000	.001600	.000050	....	....	
9, 200	46, 000	.001650	.000050	....	....	
9, 400	47, 000	.001700	.000050	....	....	
9, 600	48, 000	.001750	.000050	....	....	
9, 800	49, 000	.001800	.000050	....	....	
10, 000	50, 000	.001800	0.	....	....	
10, 200	51, 000	.001850	.000050	....	....	Elastic limit.
10, 400	52, 000	.008900	.007050	....	....	
10, 600	53, 000	.010750	.001850	....	....	
10, 800	54, 000	.011650	.000900	....	....	
11, 000	55, 000	.012450	.000800	....	....	
11, 200	56, 000	.013800	.001350	....	....	
17, 310	86, 550	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds..	86, 550
Elastic limit per square inch of original section .... do...	51, 000
Elongation per inch after rupture .... inch..	.2400
Elongation per inch under strain at elastic limit .... do...	.001850
Reduction in diameter at point of rupture .... do...	.135
Reduction in area after rupture, per cent of original section	46.2
Position of rupture	".85 from neck
Character of broken surface	silky
Elongation of inch sections	".35*, ".13

JACKET.

No. 5725.

Marks, $\substack{\text{8352 B,}\\ \text{B T, M}}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000300	.000200	....	....	
5,000	20,000	.000633	.000333	....	....	
7,500	30,000	.000967	.000334	....	....	
10,000	40,000	.001333	.000366	0.	....	
11,500	46,000	.001567	.000234	0.	....	
11,750	47,000	.001600	.000033	....	....	
12,000	48,000	.001667	.000067	....	....	
12,250	49,000	.001700	.000033	....	....	
12,500	50,000	.001767	.000067	....	....	
12,750	51,000	.001800	.000083	....	....	
13,000	52,000	.001833	.000033	....	....	Elastic limit.
						Load fell.
12,500	50,000	.003000	.001167	....	....	
12,750	51,000	.004333	.001333	....	....	
13,000	52,000	.009667	.005334	....	....	
13,250	53,000	.010167	.000500	....	....	
13,500	54,000	.011000	.000833	....	....	
13,750	55,000	.011700	.000700	....	....	
14,000	56,000	.012733	.001033	....	....	
14,250	57,000	.013500	.000767	....	....	
22,290	89,160	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,160
Elastic limit per square inch of original section	do...	52,000
Elongation per inch after rupture	inch..	.2533
Elongation per inch under strain at elastic limit	do...	.001833
Reduction in diameter at point of rupture	do...	.165
Reduction in area after rupture, per cent of original section		49.7
Position of rupture		1″.7 from neck
Character of broken surface		silky
Elongation of inch sections		″.16, ″.42, ″.13

7-INCH B. L. SIEGE HOWITZER.

TUBE.

No. 5750.

Marks, $\frac{8858\ B_1}{B\ T_1\ M}$
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000600	.000300	....	....	
6,000	30,000	.000950	.000350	....	....	
7,000	35,000	.001150	.000200	0.	....	
8,000	40,000	.001300	.000150	....	....	
8,400	42,000	.001400	.000100	.000050	.000050	
8,600	43,000	.001450	.000050	....	....	
8,800	44,000	.001500	.000050	....	....	
9,000	45,000	.001500	0.	....	....	
9,200	46,000	.001550	.000050	....	....	
9,400	47,000	.001600	.000050	....	....	Elastic limit.
9,600	48,000	.009350	.007750	....	....	
9,800	49,000	.010000	.000650	....	....	
10,000	50,000	.010500	.000500	....	....	
10,200	51,000	.011250	.000750	....	....	
10,400	52,000	.012450	.001200	....	....	
16,920	84,600	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	84,600
Elastic limit per square inch of original section	do	47,000
Elongation per inch after rupture	inch	.2650
Elongation per inch under strain at elastic limit	do	.001600
Reduction in diameter at point of rupture	do	.125
Reduction in area after rupture, per cent of original section		43.8
Position of rupture		″.55 from neck
Character of broken surface		silky
Elongation of inch sections		″.37*, ″.16

10-INCH STEEL B. L. RIFLES.

SPECIMENS FROM TUBES AND JACKETS.

TUBE.

No. 5786.

Marks, $^{8863\ B,}_{B\ T,\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000333	.000200	....	....	
5,000	20,000	.000667	.000334	....	....	
7,500	30,000	.001000	.000333	....	....	
8,750	35,000	.001200	.000200	.000033	.000033	
10,000	40,000	.001367	.000167	.000033	0.	
10.250	41,000	.001400	.000033	....	....	
10,500	42,000	.001433	.000033	....	....	
10,750	43,000	.001467	.000034	....	....	
11,000	44,000	.001500	.000033	....	....	
11,250	45,000	.001533	.000033	....	....	
11,500	46,000	.001567	.000034	....	....	
11,750	47,000	.001600	.000033	....	....	
12,000	48,000	.001633	.000033	....	....	
12,250	49,000	.001667	.000034	....	....	
12,500	50,000	.001700	.000033	....	....	
12,750	51,000	.001733	.000033	....	....	
13,000	52,000	.001800	.000067	....	....	Elastic limit.
13,250	53,000	.001967	.000167	....	....	
13,500	54,000	.002567	.000600	....	....	
13,750	55,000	.003333	.000766	....	....	
14,000	56,000	.005333	.002000	....	....	
14,250	57,000	.006667	.001334	....	....	
22,930	91,720	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	91,720
Elastic limit per square inch of original section	do...	52,000
Elongation per inch after rupture	inch..	.1800
Elongation per inch under strain at elastic limit	do...	.001800
Reduction in diameter at point of rupture	do...	.124
Reduction in area after rupture, per cent of original section		39.2
Position of rupture		1″ from neck
Character of broken surface		silky, serrated
Elongation of inch sections		″.29*, ″.14, ″.11

TUBE.

No. 5891.

Marks, $^{10155\ B,}_{M\ T,\ M}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.	....	
2, 500	10, 000	.000333	.000233	....	....	
5, 000	20, 000	.000667	.000334	....	....	
7, 500	30, 000	.001000	.000333	....	....	
8, 750	35, 000	.001200	.000200	.000033	.000033	
10, 000	40, 000	.001367	.000167	.000033	0.	
10, 250	41, 000	.001400	.000033	....	....	
10, 500	42, 000	.001433	.000033	....	....	
10, 750	43, 000	.001467	.000034	....	....	
11, 000	44, 000	.001500	.000033	....	....	
11, 250	45, 000	.001567	.000067	....	....	
11, 500	46, 000	.001633	.000066	....	....	
11, 750	47, 000	.001700	.000067	....	....	Elastic limit.
12, 000	48, 000	.004667	.002967	....	....	
12, 250	49, 000	.006500	.001833	....	....	
12, 500	50, 000	.007233	.000733	....	....	
12, 750	51, 000	.008000	.000767	....	....	
13, 000	52, 000	.009100	.001100	....	....	
21, 680	86, 720	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	86, 720
Elastic limit per square inch of original section	do...	47, 000
Elongation per inch after rupture	inch..	.2167
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		41.9
Position of rupture		1″.8 from neck
Character of broken surface		silky
Elongation of inch sections		″.15, ″.37*, ″.13

JACKET.

No. 5745.

Marks, $\overset{9020\ B,}{M\ T,\ M}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000333	.000200	....	....	
5,000	20,000	.000667	.000334	....	....	
7,500	30,000	.001000	.000333	....	....	
8,750	35,000	.001167	.000167	0.	....	
10,000	40,000	.001333	.000166	....	....	
10,500	42,000	.001400	.000067	.000033	.000033	
10,750	43,000	.001433	.000033	....	....	
11,000	44,000	.001467	.000034	....	....	
11,250	45,000	.001533	.000066	....	....	
11,500	46,000	.001567	.000034	....	....	
11,750	47,000	.001633	.000066	....	....	
12,000	48,000	.001667	.000034	....	....	
12,250	49,000	.001700	.000033	....	....	
12,500	50,000	.001733	.000033	....	....	
12,750	51,000	.001767	.000034	....	....	Elastic limit.
13,000	52,000	{ .002167 .005167	.000400 .003000	....	....	
13,250	53,000	.006167	.001000	....	....	
13,500	54,000	.007000	.000833	....	....	
13,750	55,000	.007967	.000967	....	....	
14,000	56,000	.008867	.000900	....	....	
22,590	90,360	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	90,360
Elastic limit per square inch of original section	do...	51,000
Elongation per inch after rupture	inch..	.2333
Elongation per inch under strain at elastic limit	do...	.001767
Reduction in diameter at point of rupture	do...	.164
Reduction in area after rupture, per cent of original section		49.7
Position of rupture		1″.5 from neck
Character of broken surface		silky
Elongation of inch sections		″.15, ″.38*, ″.17

JACKET.

No. 5783.

Marks, $^{9037\ B}_{M\ T,\ M}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000333	.000200	....	....	
5,000	20,000	.000700	.000367	....	....	
7,500	30,000	.001067	.000367	....	....	
8,750	35,000	.001233	.000166	0.	....	
10,000	40,000	.001433	.000200	.000033	.000038	
10,250	41,000	.001467	.000034	....	....	
10,500	42,000	.001500	.000033	....	....	
10,750	43,000	.001533	.000033	....	....	
11,000	44,000	.001567	.000034	....	....	
11,250	45,000	.001600	.000033	....	....	Elastic limit.
11,500	46,000	.001700	.000100	....	....	
11,750	47,000	.001767	.000067	....	....	
12,000	48,000	.001900	.000133	....	....	
12,250	49,000	.002367	.000467	....	....	
12,500	50,000	.005400	.003033	....	....	
22,280	89,120	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,120
Elastic limit per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.175
Reduction in area after rupture, per cent of original section		52.2
Position of rupture		1″.6 from neck
Character of broken surface		silky
Elongation of inch sections		″.13, ″.38*, ″.12

JACKET.

No. 5862.

Marks, $\frac{9721\ B.}{M\ T,\ M}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000333	.000200	....	....	
5,000	20,000	.000667	.000334	....	....	
7,500	30,000	.001033	.000366	....	....	
8,750	35,000	.001200	.000167	0.	....	
10,000	40,000	.001400	.000200	....	....	
10,500	42,000	.001467	.000067	.000033	.000033	
10,750	43,000	.001500	.000033	....	....	
11,000	44,000	.001533	.000033	....	....	
11,250	45,000	.001600	.000067	....	....	
11,500	46,000	.001633	.000033	....	....	
11,750	47,000	.001667	.000034	....	....	Elastic limit.
12,000	48,000	.003267	.001600	....	....	
12,250	49,000	.004767	.001500	....	....	
12,500	50,000	.006300	.001533	....	....	
12,750	51,000	.006700	.000400	....	....	
13,000	52,000	.007767	.001067	....	....	
22,490	89,960	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,960
Elastic limit per square inch of original section	do...	47,000
Elongation per inch after rupture	inch..	.2233
Elongation per inch under strain at elastic limit	do...	.001667
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		44.6
Position of rupture		1″ from neck
Character of broken surface		silky
Elongation of inch sections		″.32*, ″.19, ″.16

TABULATION OF TENSION SPECIMENS FROM 10-INCH STEEL B. L. RIFLES. (STEMS 3″ LONG, ″.564 DIAMETER.)

No. of test.	Position in gun.	Location of specimens.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Remarks.
			Pounds.	*Pounds.*	*P. ct.*	*P. ct.*		
5786	Tube	Middle..	52,000	91,720	18.0	39.2	Silky, serrated........	Breech end.
5891	.....do	....do ...	47,000	86,720	21.6	41.9	Silky	Muzzle end.
5745	Jacket......	....do ...	51,000	90,360	23.3	49.7	.....do	Do.
5783	.....do	....do ...	45,000	89,120	21.0	52.2	.....do	Do.
5862	.....do	....do ...	47,000	89,960	22.3	44.6	.....do	Do.

12-INCH STEEL B. L. RIFLES.

SPECIMENS FROM TUBES AND JACKETS.

TUBE.

No. 5778.

Marks, $\genfrac{}{}{0pt}{}{9429\ \mathrm{B,}}{\mathrm{M\ T,\ M}}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000333	.000233	....	....	
5,000	20,000	.000667	.000334	....	....	
7,500	30,000	.001033	.000366	....	....	
8,750	35,000	.001200	.000167	0.	....	
10,000	40,000	.001367	.000167	0.	....	
10,250	41,000	.001400	.000033	....	....	
10,500	42,000	.001433	.000033	....	....	
10,750	43,000	.001467	.000034	....	....	
11,000	44,000	.001533	.000066	....	....	
11,250	45,000	.001600	.000067	....	....	Elastic limit.
11,500	46,000	.001900	.000300	....	....	
11,750	47,000	.002667	.000767	....	....	
12,000	48,000	.003700	.001033	....	....	
12,250	49,000	.004400	.000700	....	....	
12,500	50,000	.005433	.001033	....	....	
22,670	90,680	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	90,680
Elastic limit per square inch of original section	do	45,000
Elongation per inch after rupture	inch	.2067
Elongation per inch under strain at elastic limit	do	.001600
Reduction in diameter at point of rupture	do	.125
Reduction in area after rupture, per cent of original section		39.2
Position of rupture		1″.7 from neck
Character of broken surface		silky; trace of granulation
Elongation of inch sections		″.14, ″.35*, ″.13

TUBE.

No. 5781.

Marks, $\overset{12\ R\ 34\ T}{M\ T,\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	.0	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000333	.000200	....	....	
5,000	20,000	.000667	.000334	....	....	
7,500	30,000	.000967	.000300	....	....	
8,750	35,000	.001167	.000200	0.	....	
10,000	40,000	.001333	.000166	0.	....	
10,250	41,000	.001367	.000034	....	....	
10,500	42,000	.001400	.000033	....	....	
10,750	43,000	.001433	.000033	....	....	
11,000	44,000	.001500	.000067	....	....	
11,250	45,000	.001533	.000033	....	....	
11,500	46,000	.001567	.000034	....	....	
11,750	47,000	.001600	.000033	....	....	
12,000	48,000	.001633	.000033	....	....	
12,250	49,000	.001667	.000034	....	....	
12,500	50,000	.001700	.000033	....	....	
12,750	51,000	.001733	.000033	....	....	
13,000	52,000	.001800	.000067	....	....	
13,250	53,000	.001833	.000033	....	....	Elastic limit.
13,500	54,000	.001967	.000134	....	....	
13,750	55,000	.005667	.003700	....	....	
14,000	56,000	.007667	.002000	....	....	
14,250	57,000	.009000	.001333	....	....	
14,500	58,000	.010000	.001000	....	....	
22,420	89,680	....	....	....	....	Tensile strength.

General summary.

Tensile strength, per square inch of original section	pounds	89,680
Elastic limit, per square inch of original section	do	53,000
Elongation per inch after rupture	inch	.2067
Elongation per inch under strain at elastic limit	do	.001833
Reduction in diameter at point of rupture	do	.154
Reduction in area after rupture, per cent of original section		47.2
Position of rupture		1″.6 from neck
Character of broken surface		silky
Elongation of inch sections		″.15, ″.36, ″.11

TUBE.

No. 5787.

Marks, $^{9428\ B_3}_{M\ T_2\ M}$
Diameter, ".564.
Sectional area, .25 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2.500	10,000	.000267	.000167	....	....	
5,000	20,000	.000600	.000333	....	....	
7,500	30,000	.000933	.000333	....	....	
8,750	35,000	.001100	.000167	.000033	.000033	
10,000	40,000	.001300	.000200	.000033	0.	
10,250	41,000	.001367	.000067	....	....	
10,500	42,000	.001400	.000033	....	....	
10,750	43,000	.001433	.000033	....	....	
11,000	44,000	.001467	.000034	....	....	
11,250	45,000	.001533	.000066	....	....	Elastic limit.
11,500	46,000	.001633	,000100	....	....	
11,750	47,000	.001800	.000167	....	....	
12,000	48,000	.002667	.000867	....	....	
12,250	49,000	.003600	.000933	....	....	
12,500	50,000	.005000	.001400	....	....	
22,220	88,880	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	88,880
Elastic limit per square inch of original section	do...	45,000
Elongation per inch after rupture	inch..	.2267
Elongation per inch under strain at elastic limit	do...	.001533
Reduction in diameter at point of rupture	do...	.154
Reduction in area after rupture, per cent of original section		47.2
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		".14, ".39*, ".15

TUBE.

No. 5897.

Marks, $^{10.125\ B_3}_{M\ T_2\ M}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000300	.000200	....	....	
5,000	20,000	.000667	.000367	....	....	
7,500	30,000	.001000	.000333	....	....	
8,750	35,000	.001200	.000200	.000033	.000033	
10,000	40,000	.001400	.000200	.000033	0.	
10,250	41,000	.001433	.000033	....	....	
10,500	42,000	.001500	.000067	....	....	
10,750	43,000	.001533	.000033	....	....	
11,000	44,000	.001600	.000067	....	....	Elastic limit.
11,250	45,000	.002167	.000567	....	....	
11,500	46,000	.004300	.002133	....	....	
11,750	47,000	.005200	.000900	....	....	
12,000	48,000	.006333	.001133	....	....	
12,250	49,000	.007200	.000867	....	....	
22,260	89,040	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	89,040
Elastic limit per square inch of original section	do	44,000
Elongation per inch after rupture	inch	.2200
Elongation per inch under strain at elastic limit	do	.001600
Reduction in diameter at point of rupture	do	.135
Reduction in area after rupture, per cent of original section		41.9
Position of rupture		1″.5 from neck
Character of broken surface		silky
Elongation of inch sections		″.16, ″.36*, ″.14

JACKET.

No. 5802.

Marks, $\substack{9651\ B_1 \\ B\ T,\ M}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000300	.000200	....	....	
5,000	20,000	.000667	.000367	....	....	
7,500	30,000	.001033	.000366	....	....	
8,750	35,000	.001267	.000234	.000033	.000033	
10,000	40,000	.001433	.000166	....	....	
10,500	42,000	.001533	.000100	.000067	.000034	
10,750	43,000	.001567	.000034	....	....	
11,000	44,000	.001600	.000033	....	....	
11,250	45,000	.001700	.000100	....	....	
11,500	46,000	.001767	.000067	....	....	Elastic limit.
11,750	47,000	.001867	.000100	....	....	
12,000	48,000	.002533	.000666	....	....	
12,250	49,000	.002967	.000434	....	....	
12,500	50,000	.003567	.000600	....	....	
12,750	51,000	.004067	.000500	....	....	
13,000	52,000	.004867	.000800	....	....	
23,820	95,280	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	95,280
Elastic limit per square inch of original section	do...	46,000
Elongation per inch after rupture	inch..	.2033
Elongation per inch under strain at elastic limit	do...	.001767
Reduction in diameter at point of rupture	do...	.104
Reduction in area after rupture, per cent of original section		33.5
Position of rupture		1″.45 from neck
Character of broken surface		granular 75 per cent, silky 25 per cent
Elongation of inch sections		″.17, ″.30*, ″.14

JACKET.

No. 5804.

Marks, $^{12\ R_{18}\ J}_{M\ T_1\ O}$

Diameter, ″.564.

Sectional area, .25 square inch.

Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000333	.000233	....	....	
5,000	20,000	.000700	.000367	....	....	
7,500	30,000	.001100	.000400	....	....	
8,750	35,000	.001267	.000167	.000033	.000033	
10,000	40,000	.001400	.000133	....	....	
10,500	42,000	.001467	.000067	.000067	.000034	
10,750	43,000	.001500	.000033	....	....	
11,000	44,000	.001567	.000067	....	....	
11,250	45,000	.001600	.000033	....	....	
11,500	46,000	.001633	.000033	....	....	
11,750	47,000	.001667	.000034	....	....	
12,000	48,000	.001667	0.	....	....	
12,250	49,000	.001700	.000033	....	....	
12,500	50,000	.001733	.000033	....	....	
12,750	51,000	.001767	.000034	....	....	
13,000	52,000	.001800	.000033	....	....	
13,250	53,000	.001900	.000100	....	....	
13,500	54,000	.001967	.000067	....	....	
13,750	55,000	.002000	.000033	....	....	
14,000	56,000	.002000	0.	.000067	0.	
14,250	57,000	.002033	.000033	....	....	
14,500	58,000	.002067	.000034	....	....	
14,750	59,000	.002133	.000066	....	....	
15,000	60,000	.002200	.000067	....	....	
15,250	61,000	.002267	.000067	....	....	Elastic limit.
15,500	62,000	.002433	.000166	....	....	
15,750	63,000	.003533	.001100	....	....	
16,000	64,000	.005300	.001767	....	....	
16,250	65,000	.006200	.000900	....	....	
16,500	66,000	.007333	.001133	....	....	
25,910	103,640	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	103,640
Elastic limit per square inch of original section	do...	61,000
Elongation per inch after rupture	inch..	.1867
Elongation per inch under strain at elastic limit	do...	.002267
Reduction in diameter at point of rupture	do...	.144
Reduction in area after rupture, per cent of original section		44.6
Position of rupture		1″.5 from neck
Character of broken surface		silky
Elongation of inch sections		″.12, ″.34*, ″.10

JACKET.

No. 5851.

Marks, $\genfrac{}{}{0pt}{}{12\ R_{36}\ J}{B\ T,\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.	....	
2, 500	10, 000	.000267	.000167	....	....	
5, 000	20, 000	.000600	.000333	....	....	
7, 500	30, 000	.000933	.000333	....	....	
8, 750	35, 000	.001133	.000200	0.	....	
10, 000	40, 000	.001300	.000167	....	....	
10, 500	42, 000	.001367	.000067	0.	....	
10, 750	43, 000	.001400	.000033	....	....	
11, 000	44, 000	.001467	.000067	....	....	
11, 250	45, 000	.001500	.000033	....	....	
11, 500	46, 000	.001533	.000038	....	....	
11, 750	47, 000	.001567	.000034	....	....	
12, 000	48, 000	.001600	.000033	....	....	
12, 250	49, 060	.001633	.000038	....	....	
12, 500	50, 000	.001700	.000067	....	....	
12, 750	51, 000	.001733	.000033	....	....	
13, 000	52, 000	.001767	.000034	....	....	
13, 250	53, 000	.001800	.000033	....	....	
13, 500	54, 000	.001867	.000067	....	....	Elastic limit.
13, 750	55, 000	.002067	.000200	....	....	
14, 000	56, 000	.002567	.000500	....	....	
14, 250	57, 000	.003833	001266	....	....	
14, 500	58, 000	.005000	001167	....	....	
14, 750	59, 000	.006100	.001100	....	....	
24, 940	99, 760	....	....	....	....	Tensile strength.

General summary.

Tensile strength, per square inch of original section	pounds..	99, 760
Elastic limit, per square inch of original section	do...	54, 000
Elongation per inch after rupture	inch..	.1967
Elongation per inch under strain at elastic limit	do...	.001867
Reduction in diameter at point of rupture	do...	.134
Reduction in area after rupture, per cent of original section		41.9
Position of rupture		1″.4 from neck
Character of broken surface		silky
Elongation of inch sections		″.11, ″.84*, ″.14

TABULATION OF TENSION SPECIMENS FROM 12-INCH STEEL B. L. RIFLES. (STEMS 3″ LONG, ″.564 DIAMETER.)

No. of test.	Position in gun.	Location of specimens.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Remarks.
			Pounds.	*Pounds.*	*P. ct.*	*P. ct.*		
5778	Tube	Middle .	45, 000	90, 680	20.7	39.2	Silky, trace of granulation.	Muzzle end.
5781	Tube No. 34...	Outside.	53, 000	89, 680	20.7	47.2	Silky	Do.
5787	Tube	Middle .	45, 000	88, 880	22.7	47.2	.....do	Do.
5897	.... do	....do ...	44, 000	89, 040	22.0	41.9	.....do	Do.
5802	Jacket........	Middle .	46, 000	95, 280	20.3	33.5	Granular, 75 per cent; silky, 25 per cent.	Breech end.
5804	Jacket No. 35.	Outside.	61, 000	103, 640	18.7	44.6	Silky	Muzzle end.
5851	Jacket No. 36.	....do ...	54, 000	99, 760	19.7	41.9	.....do	Breech end.

12-INCH B. L. RIFLED MORTARS.

SPECIMENS FROM TUBES AND JACKETS.

TUBE.

No. 5724.

Marks, $^{8911\ B_4}_{B\ T_2\ M}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000183	.000133	0.	....	
2, 500	10, 000	.000333	.000200	....	....	
5, 000	20, 000	.000667	.000334	....	....	
7, 500	30, 000	.001000	.000333	....	....	
8, 750	35, 000	.001167	.000167	0.	....	
10, 000	40, 000	.001367	.000200	.000033	.000033	
10, 250	41, 000	.001400	.000033	....	....	
10, 500	42, 000	.001467	.000067	....	....	
10, 750	43, 000	.001500	.000033	....	....	
11, 000	44, 000	.001567	.000067	....	....	
11, 250	45, 000	.001600	.000033	....	....	
11. 500	46. 000	.001633	.000033	....	....	Elastic limit.
11, 750	47, 000	.001733	.000100	....	....	
12, 000	48, 000	.002000	.000267	....	....	
12, 250	49, 000	.002667	.000667	....	....	
12, 500	50, 000	.003833	.001166	....	....	
12, 750	51. 000	.004667	.000834	....	....	
22, 810	89, 240	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89, 240
Elastic limit per square inch of original section	do...	46, 000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.001633
Reduction in diameter at point of rupture	do...	.165
Reduction in area after rupture, per cent of original section		49.7
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		″.11, ″.37*, ″.12

TUBE.

No. 5746.

Marks, $\genfrac{}{}{0pt}{}{9198\ B_1}{M\ T_2\ M}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000300	.000200	....	....	
5,000	20,000	.000633	.000333	....	....	
7,500	30,000	.000967	.000334	....	....	
8,750	35,000	.001133	.000166	0.	....	
10,000	40,000	.001333	.000200	.000033	.000033	
10,250	41,000	.001367	.000034	....	....	
10,500	42,000	.001400	.000033	....	....	
10,750	43,000	.001433	.000033	....	....	
11,000	44,000	.001467	.000034	....	....	
11,250	45,000	.001533	.000066	....	....	
11,500	46,000	.001600	.000067	....	....	
11,750	47,000	.001633	.000033	....	....	
12,000	48,000	.001700	.000067	....	....	Elastic limit.
		.006333	.004633	....	....	
12,250	49,000	.006767	.000434	....	....	
12,500	50,000	.007700	.000933	....	....	
12,750	51,000	.008500	.000800	....	....	
13,000	52,000	.009333	.000833	....	....	
13,250	53,000	.010333	.001000	....	....	
21,590	86,360	.1400	.129667	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section..........pounds.. 86,360
Elastic limit per square inch of original section..........do... 48,000
Elongation per inch after rupture..........inch.. .2200
Elongation per inch under strain at elastic limit..........do... .001700
Reduction in diameter at point of rupture..........do... .165
Reduction in area after rupture, per cent of original section.......... 49.7
Position of rupture.......... 1″.6 from neck
Character of broken surface.......... silky
Elongation of inch sections.......... ″.14, ″.36*, ″.16

TUBE.

No. 5757.

Marks, $\overset{9237\ B,}{B\ T,\ M}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000267	.000167			
5,000	20,000	.000633	.000366			
7,500	30,000	.000967	.000334			
8,750	35,000	.001133	.000166	0.		
10,000	40,000	.001367	.000234	0.		
10,250	41,000	.001400	.000033			
10,500	42,000	.001433	.000033			
10,750	43,000	.001500	.000067			
11,000	44,000	.001533	.000033			
11,250	45,000	.001600	.000067			
11,500	46,000	.001667	.000067			Elastic limit.
11,750	47,000	.001900	.000233			
12,000	48,000	.002733	.000833			
12,250	49,000	.003900	.001167			
12,500	50,000	.005167	.001267			
12,750	51,000	.006533	.001366			
22,180	88,720					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	88,720
Elastic limit per square inch of original section	do...	46,000
Elongation per inch after rupture	inch..	.2267
Elongation per inch under strain at elastic limit	do...	.001667
Reduction in diameter at point of rupture	do...	.165
Reduction in area after rupture, per cent of original section		49.7
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		″.14, ″.39*, ″.15

TUBE.

No. 5760.

Marks, $\substack{9237\ B_1 \\ M\ T_2\ M}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	....	....	
5,000	20,000	.000667	.000367	....	....	
7,500	30,000	.001000	.000333	....	....	
8,750	35,000	.001200	.000200	0.	....	
10,000	40,000	.001367	.000167	0.	....	
10,250	41,000	.001433	.000066	....	....	
10,500	42,000	.001500	.000067	....	....	
10,750	43,000	.001533	.000033	....	....	
11,000	44,000	.001600	.000067	....	....	Elastic limit.
11,250	45,000	.002000	.000400	....	....	
11,500	46,000	.002367	.000367	....	....	
11,750	47,000	.002767	.000400	....	....	
12,000	48,000	.003733	.000966	....	....	
12,250	49,000	.006267	.002534	....	....	
21,680	86,720	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	86,720
Elastic limit per square inch of original section	do...	44,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.165
Reduction in area after rupture, per cent of original section		49.7
Position of rupture		1″.42 from neck
Character of broken surface		silky
Elongation of inch sections		″.12, ″.34*, ″.17

TUBE.

No. 5765.

Marks, $^{12\ M\ R_{26}\ T}_{B\ T_5\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	.0	0.	Initial load.
1,250	5,000	.000133	.000133	.0	....	
2,500	10,000	.000300	.000167	....	....	
5,000	20,000	.000633	.000333	....	....	
7,500	30,000	.001000	.000367	....	....	
8,750	35,000	.001167	.000167	0.	....	
10,000	40,000	.001333	.000166	0.	....	
10,250	41,000	.001367	.000034	....	....	
10,500	42,000	.001400	.000033	....	....	
10,750	43,000	.001433	.000033	....	....	
11,000	44,000	.001467	.000034	....	....	
11,250	45,000	.001533	.000066	....	....	
11,500	46,000	.001567	.000034	....	....	
11,750	47,000	.001633	.000066	....	....	
12,000	48,000	.001633	0.	....	....	
12,250	49,000	.001667	.000034	....	....	
12,500	50,000	.001733	.000066	....	....	
12,750	51,000	.001733	0.	....	....	
13,000	52,000	.001800	.000067	....	....	
13,250	53,000	.001900	.000100	....	....	
13,500	54,000	.001967	.000067	....	....	
13,750	55,000	.002000	.000033	....	....	Elastic limit.
14,000	56,000	.002133	.000133	....	....	
14,250	57,000	.002333	.000200	....	....	
14,500	58,000	.002667	.000334	....	....	
14,750	59,000	.003267	.000600	....	....	
15,000	60,000	.004333	.001066	....	....	
24,070	96,280	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	96,280
Elastic limit per square inch of original section	do...	55,000
Elongation per inch after rupture	inch..	.1967
Elongation per inch under strain at elastic limit	do...	.002000
Reduction in diameter at point of rupture	do...	.134
Reduction in area after rupture, per cent of original section		41.9
Position of rupture		1″.6 from neck
Character of broken surface		silky, irregular surface
Elongation of inch sections		″.14, ″.34*, ″.11

TUBE.

No. 5766.

Marks, 9237 B, M T, M
Diameter, ''.565.
Sectional area, .25 square inch.
Gauged length, 3''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000300	.000167			
5,000	20,000	.000633	.000333			
7,500	80,000	.000967	.000334			
8,750	35,000	.001133	.000166	0.		
10,000	40,000	.001300	.000167	0.		
10,250	41,000	.001333	.000033			
10,500	42,000	.001367	.000034			
10,750	43,000	.001400	.000033			
11,000	44,000	.001433	.000033			
11,250	45,000	.001467	.000034			
11.500	46,000	.001500	.000033			
11,750	47,000	.001567	.000067			Elastic limit.
12,000	48,000	.003500	.001933			
12,250	49,000	.006000	.002500			
12,500	50,000	.006667	.000667			
12,750	51,000	.007433	.000766			
13,000	52,000	.008500	.001067			
22,230	88,920					Tensile strength.

General summary.

Tensile strength per square inch of original section	**pounds..**	**88,920**
Elastic limit per sqare inch of original section	**do...**	**47,000**
Elongation per inch after rupture	**inch..**	**.2400**
Elongation per inch under strain at elastic limit	**do...**	**.001567**
Reduction in diameter at point of rupture	**do...**	**.155**
Reduction in area after rupture, per cent of original section		**47.2**
Position of rupture		**at middle of stem**
Character of broken surface		**silky**
Elongation of inch sections		**''.16, ''.41*, ''.15**

TUBE.

No. 5773.

Marks, $^{12\ M\ R_{31}\ T}_{M\ T,\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000300	.000200			
5,000	20,000	.000633	.000333			
7,500	30,000	.000967	.000334	0.		
8,750	35,000	.001167	.000200	0.		
10,000	40,000	.001300	.000133			
10,250	41,000	.001333	.000033			
10,500	42,000	.001367	.000034			
10,750	43,000	.001433	.000066			
11,000	44,000	.001467	.000034			
11,250	45,000	.001533	.000066			
11,500	46,000	.001567	.000034			
11,750	47,000	.001600	.000033			
12,000	48,000	.001633	.000033			
12,250	49,000	.001667	.000034			
12,500	50,000	.001700	.000033			
12,750	51,000	.001733	.000033			
13,000	52,000	.001767	.000034			Elastic limit.
13,250	53,000	.001867	.000100			
13,500	54,000	.001933	.000066			
13,750	55,000	.002100	.000167			
14,000	56,000	.004500	.002400			
14,250	57,000	.006000	.001500			
23,080	92,320					Tensile strength.

General summary.

Tensile strength, per square inch of original section	pounds..	92,320
Elastic limit, per square inch of original section	do...	52,000
Elongation per inch after rupture	inch..	.2033
Elongation per inch under strain at elastic limit	do...	.001767
Reduction in diameter at point of rupture	do...	.154
Reduction in area after rupture, per cent of original section		47.2
Position of rupture		″.12 from neck
Character of broken surface		silky
Elongation of inch sections		″.11, ″.23, ″.27

TUBE.

No. 5845.

Marks, $^{12\,M\,R_{II}\,T}_{B\,T,\,O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000267	.000134			
5,000	20,000	.000600	.000333			
7,500	30,000	.000933	.000333			
8,750	35,000	.001100	.000167	0.		
10,000	40,000	.001300	.000200	.000033	.000033	
10,250	41,000	.001333	.000033			
10,500	42,000	.001367	.000034			
10,750	43,000	.001400	.000033			
11,000	44,000	.001433	.000033			
11,250	45,000	.001467	.000034			
11,500	46,000	.001533	.000066			
11,750	47,000	.001600	.000067			
12,000	48,000	.001633	.000033			
12,250	49,000	.001667	.000034			Elastic limit.
12,500	50,000	.001900	.000233			
12,750	51,000	.002833	.000933			
13,000	52,000	.004833	.002000			
13,250	53,000	.006000	.001167			
13,500	54,000	.007333	.001333			
22,390	89,560					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,560
Elastic limit per square inch of original section	do...	49,000
Elongation per inch after rupture	inch..	.2300
Elongation per inch under strain at elastic limit	do...	.001667
Reduction in diameter at point of rupture	do...	.164
Reduction in area after rupture, per cent of original section		49.7
Position of rupture		1″ from neck
Character of broken surface		silky
Elongation of inch sections		″.37*, ″.19, ″.13

TUBE.

No. 5850.

Marks, $\genfrac{}{}{0pt}{}{7285\text{ B,}}{\text{M T, M}}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.	....	
2,500	10,000	.000300	.000167	....	....	
5,000	20,000	.000700	.000400	....	....	
7,500	30,000	.001033	.000333	....	....	
8,750	35,000	.001200	.000167	0.	....	
10,000	40,000	.001400	.000200	0.	....	
10,250	41,000	.001433	.000033	....	....	
10,500	42,000	.001467	.000034	....	....	
10,750	43,000	.001500	.000033	....	....	
11,000	44,000	.001567	.000067	....	....	
11,250	45,000	.001600	.000033	....	....	
11,500	46,000	.001633	.000033	....	....	
11,750	47,000	.001667	.000034	....	....	
12,000	48,000	.001700	.000033	....	....	
12,250	49,000	.001733	.000033	....	....	
12,500	50,000	.001800	.000067	....	....	
12,750	51.000	.001833	.000033	....	....	Elastic limit.
13,000	52,000	.002000	.000167	....	....	
13,250	53,000	.004500	.002500	....	....	
13,500	54,000	.006333	.001833	....	....	
13,750	55,000	.006833	.000500	....	....	
14,000	56,000	.008000	.001167	....	....	
23,100	92,400	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	92,400
Elastic limit per square inch of original section	do...	51,000
Elongation per inch after rupture	inch..	.1933
Elongation per inch under strain at elastic limit	do...	.001833
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		83.5
Position of rupture		at middle of the stem
Character of broken surface		granular, flaky metal on one side
Elongation of inch sections		″.12, ″.31*, ″.15

TUBE.

No. 5777.

Marks, $^{9390\ B}_{M\ T,\ M}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.	....	
2. 500	10, 000	.000300	.000200	....	....	
5, 000	20, 000	.000633	.000333	....	....	
7, 500	30, 000	.000967	.000334	....	....	
8, 750	35, 000	.001133	.000166	0.	....	
10, 000	40, 000	.001300	.000167	0.	....	
10, 250	41, 000	.001333	.000033	....	....	
10, 500	42. 000	.001367	.000034	....	....	
10, 750	43, 000	.001400	.000033	....	....	
11, 000	44, 000	.001433	.000033	....	....	
11, 250	45, 000	.001467	.000034	....	....	
11, 500	46, 000	.001533	.000066	....	....	Elastic limit.
11, 750	47, 000	.008767	.007234	....	....	
12, 000	48, 000	.009833	.001066	....	....	
12, 250	49, 000	.010667	.000834	....	....	
12, 500	50, 000	.011667	.001000	....	....	
12, 750	51, 000	.012433	.000766	....	....	
21, 010	84, 040	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds..	**84, 040**
Elastic limit per square inch of original section .... do...	**46, 000**
Elongation per inch after rupture .... inch..	**.2333**
Elongation per inch under strain at elastic limit .... do...	**.001533**
Reduction in diameter at point of rupture .... do...	**.145**
Reduction in area after rupture, per cent of original section	**44.6**
Position of rupture	**1″.05 from neck**
Character of broken surface	**silky**
Elongation of inch sections	**″.37*, ″.21, ″.12**

TUBE.

No. 5797.

Marks, $\substack{9662\ B_4 \\ M\ T,\ M}$

Diameter, ″.565.

Sectional area, .25 square inch.

Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,500	10,000	.000333	.000233	....	....	
5,000	20,000	.000667	.000334	....	....	
7,500	30,000	.001000	.000333	....	....	
8,750	35,000	.001233	.000233	0.	....	
10,000	40,000	.001367	.000134	0.	....	
10,250	41,000	.001433	.000066	....	....	
10,500	42,000	.001467	.000034	....	....	
10,750	43,000	.001533	.000066	....	....	
11,000	44,000	.001567	.000034	....	....	
11,250	45,000	.001600	.000033	....	....	
11,500	46,000	.001633	.000033	....	....	
11,750	47,000	.001667	.000034	....	....	
12,000	48,000	.001700	.000033	....	....	
12,250	49,000	.001733	.000033	....	....	
12,500	50,000	.001767	.000034	....	....	Elastic limit.
12,750	51,000	.001867	.000100	....	....	
13,000	52,000	.005667	.003800	....	....	
13,250	53,000	.006133	.000466	....	....	
13,500	54,000	.007167	.001034	....	....	
13,750	55,000	.008100	.000933	....	....	
22,310	89,240	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,240
Elastic limit per square inch of original section	do...	50,000
Elongation per inch after rupture	inch..	.2333
Elongation per inch under strain at elastic limit	do...	.001767
Reduction in diameter at point of rupture	do...	.165
Reduction in area after rupture, per cent of original section		49.7
Position of rupture		1.″10 from neck
Character of broken surface		silky
Elongation of inch sections		″.37*, ″.19, ″.14

TUBE.

No. 5803.

Marks, $\begin{smallmatrix}12\ M\ R_{38}\ T\\ M\ T_4\ O\end{smallmatrix}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000300	.000200	....	....	
5,000	20.000	.000633	.000333	....	....	
7,500	30,000	.000967	.000334	....	....	
8,750	35,000	.001133	.000166	0.	....	
10,000	40,000	.001333	.000200	0.	....	
10,250	41,000	.001367	.000034	....	....	
10,500	42,000	.001400	.000033	....	....	
10,750	43,000	.001433	.000033	....	....	
11,000	44,000	.001467	.000034	....	....	
11,250	45,000	.001500	.000033	....	....	
11,500	46,000	.001533	.000033	....	....	
11,750	47,000	.001600	.000067	....	....	
12,000	48,000	.001633	.000033	....	....	
12,250	49,000	.001667	.000034	....	....	
12,500	50,000	.001700	.000033	....	....	
12,750	51,000	.001733	.000033	....	....	
13,000	52,000	.001767	.000034	....	....	
13,250	53,000	.001800	.000033	....	....	Elastic limit.
13,500	54,000	.001900	.000100	....	....	
13,750	55,000	.002000	.000100	....	....	
14,000	56,000	.002300	.000300	....	....	
14,250	57,000	.002967	.000667	....	....	
14,500	58,000	.004500	.001538	....	....	
24,080	96,320	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	96,320
Elastic limit per square inch of original section	do	53,000
Elongation per inch after rupture	inch	.2033
Elongation per inch under strain at elastic limit	do	.001800
Reduction in diameter at point of rupture	do	.144
Reduction in area after rupture, per cent of original section		44.6
Position of rupture		at middle of stem
Character of broken surface		silky, trace of granulation
Elongation of inch sections		″.13, ″.84*, ″.14

TUBE.

No. 5812.

Marks, $^{\mathrm{12\,M\,R\,35\,T}}_{\mathrm{B\,T,\,O}}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000267	.000167	....	....	
5,000	20,000	.000600	.000333	....	....	
7,500	30,000	.000967	.000367	....	....	
8,750	35,000	.001183	.000166	0.	....	
10,000	40,000	.001333	.000200	.000033	.000033	
10,250	41,000	.001367	.000034	....	....	
10,500	42,000	.001400	.000033	....	....	
10,750	43,000	.001467	.000067	....	....	Elastic limit.
11,000	44,000	.010000	.008533	....	....	
11,250	45,000	.010667	.000667	....	....	
11,500	46,000	.011333	.000666	....	....	
11,750	47,000	.011967	.000634	....	....	
12,000	48,000	.012833	.000866	....	....	
22,420	89,680	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,680
Elastic limit per square inch of original section	do...	43,000
Elongation per inch after rupture	inch..	.2133
Elongation per inch under strain at elastic limit	do ..	.001467
Reduction in diameter at point of rupture	do...	.104
Reduction in area after rupture, per cent of original section		33.5
Position of rupture		1″.3 from neck
Character of broken surface		silky 40 per cent, granular 60 per cent
Elongation of inch sections		″.15, ″.25*, ″.24*

TUBE.

No. 5816.

Marks, $\substack{9662\ B_5 \\ B\ T, M}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000300	.000200	....	....	
5,000	20,000	.000633	.000333	....	....	
7,500	30,000	.001000	.000367	.000033	.000033	
8,750	35,000	.001200	.000200	.000033	0.	
10,000	40,000	.001400	.000200	....	....	
10,250	41,000	.001433	.000033	....	....	
10,500	42,000	.001467	.000034	....	....	
10,750	43,000	.001467	0.	....	....	
11,000	44,000	.001500	.000033	....	....	
11,250	45,000	.061533	.000033	....	....	
11,500	46,000	.001567	.000034	....	....	
11,750	47,000	.001633	.000066	....	....	
12,000	48,000	.001733	.000100	....	....	Elastic limit.
12.250	49,000	.001983	.000200	....	....	
12,500	50,000	.004800	.002867	....	....	
12,750	51,000	.006333	.001533	....	....	
13,000	52,000	.007333	.001000	....	....	
13,250	53,000	.008367	.001034	....	....	
21,820	87,280	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	87,280
Elastic limit per square inch of original section	do...	48,000
Elongation per inch after rupture	inch..	.2267
Elongation per inch under strain at elastic limit	do...	.001733
Reduction in diameter at point of rupture	do...	.145
Redaction in area after rupture, per cent of original section		44.6
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		″.17, ″.39*, ″.12

TUBE.

No. 5857.

Marks, $^{12\ M\ R_{10}\ T}_{M\ T\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauge length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.	....	
2, 500	10, 000	.000300	.000200	....	....	
5, 000	20, 000	.000633	.000333	....	....	
7, 500	30. 000	.000933	.000300	....	....	
8, 750	35. 000	.001100	.000167	0.	....	
10, 000	40, 000	.001300	.000200	0.	....	
10, 250	41, 000	.001333	.000033	....	....	
10. 500	42, 000	.001367	.000034	....	....	
10, 750	43, 000	.001400	.000033	....	....	
11, 000	44, 000	.001433	.000033	....	....	
11, 250	45, 000	.001467	.000034	....	....	
11, 500	46, 000	.001500	.000033	....	....	
11. 750	47, 000	.001533	.000033	....	....	
12, 000	48, 000	.001567	.000034	....	....	
12, 250	49, 000	.001600	.000033	....	....	
12, 500	50, 000	.001633	.000033	....	....	
12, 750	51, 000	.001733	.000100	....	....	
13, 000	52, 000	.001767	.000034	....	....	
13, 250	53, 000	.001800	.000033	....	....	
13, 500	54, 000	.001833	.000033	....	....	
13, 750	55, 000	.001867	.000034	....	....	Elastic limit.
14, 000	56. 000	.006667	.004800	....	....	
14, 250	57, 000	.007200	.000533	....	....	
14, 500	58, 000	.008133	.000933	....	....	
14, 750	59, 000	.009167	.001034	....	....	
15, 000	60, 000	.010333	.001166	....	....	
22, 980	91, 920	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	91, 920
Elastic limit per square inch of original section	do	55, 000
Elongation per inch after rupture	inch	.2233
Elongation per inch under strain at elastic limit	do	.001867
Reduction in diameter at point of rupture	do	.154
Reduction in area after rupture, per cent of original section		47.2
Position of rupture		1″.3 from neck
Character of broken surface		fine, silky
Elongation of inch sections		″.27, ″.29*, ″.11

TUBE.

No. 5890.

Marks, $^{9661\ B_1}_{B\ T_2\ M}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	....	....	
2,500	10,000	.000333	.000233	....	....	
5,000	20,000	.000667	.000334	....	....	
7,500	30,000	.001000	.000333	....	....	
8,750	35,000	.001200	.000200	.000033	.000033	
10,000	40,000	.001367	.000167	.000033	0.	
10,250	41,000	.001400	.000033	....	....	
10,500	42,000	.001433	.000033	....	....	
10,750	43,000	.001500	.000067	....	....	
11,000	44,000	.001567	.000067	....	....	
11,250	45,000	.001600	.000033	....	....	
11,500	46,000	.001633	.000033	....	....	
11,750	47,000	.001667	.000034	....	....	
12,000	48,000	.001733	.000066	....	....	Elastic limit.
12,250	49,000	.006333	.004600	....	....	
12,500	50,000	.007233	.000900	....	....	
12,750	51,000	.007833	.000600	....	....	
13,000	52,000	.009333	.001500	....	....	
13,250	53,000	.010000	.000667	....	....	
21,930	87,720	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section....................pounds.. 87,720
Elastic limit per square inch of original section....................do... 48,000
Elongation per inch after rupture....................inch.. .1933
Elongation per inch under strain at elastic limit....................do... .001733
Reduction in diameter at point of rupture....................do... .105
Reduction in area after rupture, per cent of original section.................... 33.5
Position of rupture.................... 1″.1 from neck
Character of broken surface.................... granular, 60 per cent; dull, silky, flaky, 40 per cent
Elongation of inch sections.................... ″.23, ″.21, ″.14

TUBE.

No. 5911.

Marks, $^{10246\ B}_{M\ T,\ M}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000300	.000233	....	....	
5,000	20,000	.000633	.000333	....	....	
7,500	30,000	.001000	.000367	....	....	
8,750	35,000	.001167	.000167	0.	....	
10,000	40,000	.001367	.000200	.000033	000033	
10,250	41,000	.001400	.000033	....	....	
10,500	42,000	.001433	.000033	....	....	
10,750	43,000	.001467	.000034	....	....	
11,000	44,000	.001533	.000066	....	....	
11,250	45,000	.001567	.000034	....	....	
11,500	46,000	.001633	.000066	....	....	
11,750	47,000	.001667	.000034	....	....	
12,000	48,000	.001700	.000033	....	....	Elastic limit.
12,250	49,000	.001800	.000100	....	....	
12,500	50,000	.007867	.006067	....	....	
12,750	51,000	.008167	.000300	....	....	
13,000	52,000	.008767	.000600	....	....	
13,250	53,000	.009833	.001066	....	....	
21,360	85,440	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	85,440
Elastic limit per square inch of original section	do...	48,000
Elongation per inch after rupture	inch..	.2267
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.155
Reduction in area after rupture, per cent of original section		47.2
Position of rupture		1″.4 from neck
Character of broken surface		silky
Elongation of inch sections		″.20, ″.32*, ″.16

TUBE.

No. 5967.

Marks, $\genfrac{}{}{0pt}{}{10166\ B,}{M\ T,\ M}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	0.	....	
2,500	10,000	.000333	.000166	....	....	
5,000	20,000	.000667	.000334	....	....	
7,500	30,000	.001000	.000333	....	....	
8,750	35,000	.001200	.000200	0.	....	
10,000	40,000	.001400	.000200	.000033	.000033	
10,250	41,000	.001433	.000033	....	....	
10,500	42,000	.001500	.000067	....	....	
10,750	43,000	.001533	.000033	....	....	Elastic limit.
11,000	44,000	.001633	.000100	....	....	
11,250	45,000	.001900	.000267	....	....	
11,500	46,000	.004500	.002600	....	....	
11,750	47,000	.005767	.001267	....	....	
12,000	48,000	.006667	.000900	....	....	
21,310	85,240	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	**pounds**	**85,240**
Elastic limit per square inch of original section	**do**	**43,000**
Elongation per inch after rupture	**inch**	**.2333**
Elongation per inch under strain at elastic limit	**do**	**.001533**
Reduction in diameter at point of rupture	**do**	**.165**
Reduction in area after rupture, per cent of original section		**49.7**
Position of rupture		**″.6 from neck**
Character of broken surface		**silky**
Elongation of inch sections		**″.39*, ″.18, ″.13**

JACKET.

No. 5726.

Marks, $^{8977\ B,}_{B\ T,\ M}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000300	.000200	....	....	
5,000	20,000	.000633	.000333	....	....	
7,500	30,000	.000967	.000334	....	....	
8,750	35,000	.001133	.000166	0.	....	
10,000	40,000	.001300	.000167	0.	....	
10,250	41,000	.001333	.000033	....	....	
10,500	42,000	.001367	.000034	....	....	
10,750	43,000	.001400	.000033	....	....	
11,000	44,000	.001433	.000033	....	....	
11,250	45,000	.001500	.000067	....	....	
11,500	46,000	.001533	.000033	....	....	Elastic limit.
11,750	47,000	.001633	.000100	....	....	
12,000	48,000	.005000	.003367	....	....	
12,250	49,000	.005967	.000967	....	....	
12,500	50,000	.006933	.000966	....	....	
12,750	51,000	.007600	.000667	....	....	
22,120	88,480	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	88,480
Elastic limit per square inch of original section	do...	46,000
Elongation per inch after rupture	inch..	.2100
Elongation per inch under strain at elastic limit	do...	.001533
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		44.6
Position of rupture		1″.3 from neck
Character of broken surface		silky
Elongation of inch sections		″.15, ″.30,* ″.18

JACKET.

No. 5758.

Marks, $\substack{8611\ B,\\ B\ T_2\ M}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000300	.000200	....	....	
5,000	20,000	.000633	.000333	....	....	
7,500	30,000	.000967	.000334	....	....	
8,750	35,000	.001133	.000166	.000033	.000033	
10,000	40,000	.001333	.000200	.000033	0.	
10,250	41,000	.001367	.000034	....	....	
10,500	42,000	.001400	.000033	....	....	
10,750	43,000	.001433	.000033	....	....	
11,000	44,000	.001467	.000034	....	....	
11,250	45,000	.001500	.000033	....	....	
11,500	46,000	.001533	.000033	....	....	
11,750	47,000	.001567	.000034	....	....	Elastic limit.
12,000	48,000	.003667	.002100	....	....	
12,250	49,000	.007167	.003500	....	....	
12,500	50,000	.007667	.000500	....	....	
12,750	51,000	.008333	.000666	....	....	
13,000	52,000	.009000	.000667	....	....	
22,560	90,240	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	90,240
Elastic limit per square inch of original section........do...	47,000
Elongation per inch after rupture........inch..	.2167
Elongation per inch under strain at elastic limit........do...	.001567
Reduction in diameter at point of rupture........do...	.165
Reduction in area after rupture, per cent of original section........	49.7
Position of rupture........	1″.6 from neck
Character of broken surface........	silky
Elongation of inch sections........	″.13, ″.37*, ″.15

JACKET.

No. 5761.

Marks, $\genfrac{}{}{0pt}{}{9206\ B_3}{B\ T_4\ M}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000133	.000133	0.		
2,500	10,000	.000300	.000167			
5,000	20,000	.000667	.000367			
7,500	30,000	.001000	.000333			
8,750	35,000	.001200	.000200	.000033	.000033	
10,000	40,000	.001400	.000200			
10,500	42,000	.001467	.000067	.000033	0.	
10,750	43,000	.001533	.000066			
11,000	44,000	.001567	.000034			
11,250	45,000	.001633	.000066			
11,500	46,000	.001667	.000034			
11,750	47,000	.001700	.000033			
12,000	48,000	.001733	.000933			Elastic limit.
12,250	49,000	.001800 .003167	.000067 .001367			
12,500	50,000	.003767	.000600			
12,750	51,000	.004333	.000566			
13,000	52,000	.006833	.002500			
13,250	53,000	.007500	.000667			
23,180	92,720					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	92,720
Elastic limit per square inch of original section	do...	48,000
Elongation per inch after rupture	inch..	.1733
Elongation per inch under strain at elastic limit	do...	.001733
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		44.6
Position of rupture		″.75 from neck
Character of broken surface		fine, silky
Elongation of inch sections		″.09, ″.09, ″.34

JACKET.

No. 5768.

Marks, $\genfrac{}{}{0pt}{}{9390\ B_1}{B\ T_4\ M}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongatian per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	0.	....	
2,500	10,000	.000333	.000166	....	....	
5,000	20,000	.000667	.000334	....	....	
7,500	30,000	.001033	.000366	....	....	
8,750	35,000	.001200	.000167	0.	....	
10,000	40,000	.001400	.000200	....	....	
10,500	42,000	.001500	.000100	0.	....	
10,750	43,000	.001533	.000033	....	....	
11,000	44,000	.001567	.000034	....	....	
11,250	45,000	.001633	.000066	....	....	
11,500	46,000	.001667	.000034	....	....	
11,750	47,000	.001733	.000066	....	....	Elastic limit.
12,000	48,000	.001867	.000134	....	....	
12,250	49,000	.002133	.000266	....	....	
12,500	50,000	.002700	.000567	....	....	
12,750	51,000	.003533	.000833	....	....	
13,000	52,000	.005467	.001934	....	....	
23,240	92,960	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	92,960
Elastic limit per square inch of original section	do...	47.000
Elongation per inch after rupture	inch..	.2167
Elongation per inch under strain at elastic limit	do...	.001733
Reduction in diameter at point of rupture	do...	.154
Reduction in area after rupture, per cent of original section		47.2
Position of rupture		1″.65 from neck
Character of broken surface		silky, irregular surface
Elongation of inch sections		″.14, ″.39*, ″.12

JACKET.

No. 5782.

Marks, $^{9655\ B_1}_{B\ T_4\ M}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000167	.000167	....	....	
2,500	10,000	.000333	.000166	....	....	
5,000	20,000	.000667	.000334	....	....	
7,500	30,000	.001000	.000333	....	....	
8,750	35,000	.001200	.000200	0.	....	
10,000	40,000	.001400	.000200	....	....	
10,500	42,000	.001467	.000067	0.	....	
10,750	43,000	.001533	.000066	....	....	
11,000	44,000	.001567	.000034	....	....	
11,250	45,000	.001600	.000033	....	....	
11,500	46,000	.001667	.000067	....	....	
11,750	47,000	.001733	.000066	....	....	Elastic limit.
12,000	48,000	.001967	.000234	....	....	
12,250	49,000	.002767	.000800	....	....	
12,500	50,000	.004267	.001500	....	....	
12,750	51,000	.005000	.000733	....	....	
13,000	52,000	.006167	.001167	....	....	
23,090	92,360	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	92,360
Elastic limit per square inch of original section	do...	47,000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.001733
Reduction in diameter at point of rupture	do...	.155
Reduction in area after rupture, per cent of original section		47.2
Position of rupture		1″.1 from neck
Character of broken surface		silky
Elongation of inch sections		″.30*, ″.18, ″.12

JACKET.

No. 5813.

Marks, $^{12\ M\ R_{18}\ J}_{B\ T_1\ O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000183	.000183	0.	....	
2,500	10,000	.000333	.000200	....	....	
5,000	20,000	.000667	.000334	....	....	
7,500	30.000	.001000	.000333	....	....	
8,750	35 000	.001167	.000167	.000033	.000033	
10,000	40,000	.001333	.000166	....	....	
10,500	42,000	.001400	.000067	.000033	0.	
10,750	43,000	.001433	.000033	....	....	
11,000	44,000	.001467	.000034	....	....	
11,250	45,000	.001500	.000033	....	....	
11,500	46,000	.001533	.000033	....	....	
11,750	47,000	.001567	.000034	....	....	
12,000	48,000	.001633	.000066	....	....	
12,250	49,000	.001667	.000034	....	....	
12,500	50,000	.001700	.000033	....	....	
12,750	51,000	.001733	.000033	....	....	
13,000	52,000	.001767	.000034	....	....	
13,250	53,000	.001800	.000033	....	....	
13,500	54,000	.001833	.000033	....	....	Elastic limit.
13,750	55,000	.008467	.006634	....	....	
14,000	56,000	.009167	.000700	....	....	
14,250	57,000	.010000	.000833	....	....	
14,500	58,000	.011167	.001167	....	....	
14,750	59,000	.012000	.000833	....	....	
22,610	90,440	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	90,440
Elastic limit per square inch of original section	do	54,000
Elongation per inch after rupture	inch	.2367
Elongation per inch under strain at elastic limit	do	.001833
Reduction in diameter at point of rupture	do	.174
Reduction in area after rupture, per cent of original section		52.2
Position of rupture		1″.4 from neck
Character of broken surface		silky
Elongation of inch sections		″.20, ″.39*, ″.12

JACKET.

No. 5817.

Marks, $\begin{smallmatrix}9711\ B_3\\ M\ T_4\ M\end{smallmatrix}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000300	.000200			
5,000	20,000	.000667	.000367			
7,500	30,000	.001033	.000366			
8,750	35,000	.001167	.000134	.000033	.000033	
10,000	40,000	.001367	.000200			
10,500	42,000	.001433	.000066	.000067	.000034	
10,750	43,000	.001467	.000034			
11,000	44,000	.001533	.000066			
11,250	45,000	.001567	.000034			
11,500	46,000	.001633	.000066			
11,750	47,000	.001667	.000034			
12,000	48,000	.001733	.000066			
12,250	49,000	.001767	.000034			Elastic limit.
12,500	50,000	.001933	.000166			
12,750	51,000	.002267	.000334			
13,000	52,000	.004100	.001833			
13,250	53,000	.005767	.001667			
13,500	54,000	.006833	.001066			
23,220	92,880					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	92,880
Elastic limit per square inch of original section	do	49,000
Elongation per inch after rupture	inch	.2033
Elongation per inch under strain at elastic limit	do	.001767
Reduction in diameter at point of rupture	do	.145
Reduction in area after rupture, per cent of original section		44.6
Position of rupture		″.7 from neck
Character of broken surface		silky
Elongation of inch sections		″.34*, ″.14, ″.13

JACKET.

No. 5818.

Marks, $\begin{matrix}12\ \mathrm{M}\ \mathrm{R}_{38}\ \mathrm{J}\\ \mathrm{M}\ \mathrm{T}_{1}\ \mathrm{O}\end{matrix}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000300	.000200	....	....	
5,000	20,000	.000667	.000367	....	....	
7,500	30,000	.001000	.000333	....	....	
8,750	35,000	.001167	.000167	.000033	.000033	
10,000	40,000	.001367	.000200	....	....	
10,250	41,000	.001400	.000033	....	....	Elastic limit.
10,500	42,000	.007667	.006267	.006000	.005967	
10,750	43,000	.009500	.001833	....	....	
11,000	44,000	.010833	.001333	....	....	
11,250	45,000	.011333	.000500	....	....	
11,500	46,000	.012400	.001061	....	....	
21,310	85,240	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	85,240
Elastic limit per square inch of original section	do...	41,000
Elongation per inch after rupture	inch..	.2467
Elongation per inch under strain at elastic limit	do...	.001400
Reduction in diameter at point of rupture	do...	.164
Reduction in area after rupture, per cent of original section		49.7
Position of rupture		1″.8 from neck
Character of broken surface		silky
Elongation of inch sections		″.17, ″.41*, ″.16

JACKET.

No. 5859.

Marks, $\substack{12\,M\,R_{40}\,J \\ M\,T_1\,O}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.	....	
2, 500	19, 000	.000267	.000167	....	....	
5, 000	20, 000	.000600	.000333	....	....	
7, 500	80, 000	.001000	.000400	....	....	
8, 750	85, 000	.001133	.000133	0.	....	
9, 750	39, 000	.001333	.000200	....	....	Elastic limit.
10, 000	40, 000	.001467	.000134	....	....	
10, 250	41, 000	.009100	.007633	....	....	
10, 500	42, 000	.010633	.001533	....	....	
10, 750	43, 000	.011000	.000367	....	....	
11, 000	44, 000	.011600	.000600	....	....	
21, 230	84, 920	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section....................pounds..	84, 920
Elastic limit per square inch of original section....................do...	39, 000
Elongation per inch after rupture....................inch..	.2300
Elongation per inch under strain at elastic limit....................do...	.001333
Reduction in diameter at point of rupture....................do...	.144
Reduction in area after rupture, per cent of original section....................	44.6
Position of rupture....................	″.8 from neck
Character of broken surface....................	silky
Elongation of inch sections....................	″.15, ″.17, ″.37*

JACKET.

No. 5858.

Marks, $^{12\text{ M R}_4\text{ J}}_{\text{M T}_1\text{ O}}$
Diameter, ″.564.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000300	.000200			
5,000	20,000	.000667	.000167			
7,500	30,000	.001000	.000333			
8,750	35,000	.001167	.000167	0.		
10,000	40,000	.001333	.000166			
10,500	42,000	.001400	.000067	0.		
10,750	43,000	.001433	.000033			
11,000	44,000	.001467	.000034			
11,250	45,000	.001500	.000033			
11,500	46,000	.001533	.000033			
11,750	47,000	.001567	.000034			
12,000	48,000	.001567	0.			
12,250	49,000	.001600	.000038			
12,500	50,000	.001633	.000033			
12,750	51,000	.001667	.000034			
13,000	52,000	.001733	.000066			
13,250	53,000	.001800	.000067			Elastic limit.
13,500	54,000	.009367	.007567			
13,750	55,000	.009833	.000466			
14,000	56,000	.011333	.001500			
21,610	86,440					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	86,440
Elastic limit per square inch of original section	do...	53,000
Elongation per inch after rupture	inch..	.2133
Elongation per inch under strain at elastic limit	do...	.001800
Reduction in diameter at point of rupture	do...	.164
Reduction in area after rupture, per cent of original section		49.7
Position of rupture		″.95 from neck
Character of broken surface		fine silky
Elongation of inch sections		″.11, ″.16, ″.37*

JACKET.

No. 5865.

Marks, $^{9687\ B,}_{M\ T,\ M}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000267	.000200	....	....	
5,000	20,000	.000633	.000366	....	....	
7,500	30,000	.001000	.000367	....	....	
8,750	35,000	.001167	.000167	0.	....	
10,000	40,000	.001333	.000166	....	....	
10,500	42,000	.001400	.000067	0.	....	
10,750	43,000	.001433	.000033	....	....	
11,000	44,000	.001500	.000067	....	....	
11,250	45,000	.001567	.000067	....	....	
11,500	46,000	.001633	.000066	....	....	
11,750	47,000	.001667	.000034	....	....	
12,000	48,000	.001700	.000033	....	....	Elastic limit.
12,250	49,000	.002000	.000300	....	....	
12,500	50,000	.003833	.001833	....	....	
12,750	51,000	.005033	.001200	....	....	
13,000	52,000	.005833	.000800	....	....	
13,250	53,000	.006700	.000867	....	....	
23,720	94,880	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	94,880
Elastic limit per square inch of original section	do...	48,000
Elongation per inch after rupture	inch..	.1800
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		39.2
Position of rupture		1″.4 from neck
Character of broken surface		silky, 50 per cent; granular, 50 per cent
Elongation of inch sections		″.13, ″.29+, ″.12

JACKET.

No. 5868.

Marks, $\genfrac{}{}{0pt}{}{12\ M\ R_{44}\ J}{B\ T,\ O}$
Diameter, ''.564.
Sectional area, .25 square inch.
Gauged length, 3''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.	....	
2,500	10,000	.000333	.000233	....	....	
5,000	20,000	.000667	.000334	....	....	
7,500	30,000	.001000	.000333	....	....	
8,750	35,000	.001167	.000167	0.	....	
10,000	40,000	.001333	.000166	....	....	
10,500	42,000	.001400	.000067	0.	....	
10,750	43,000	.001483	.000033	....	....	
11,000	44,000	.001467	.000034	....	....	
11,250	45,000	.001500	.000033	....	....	
11,500	46,000	.001533	.000033	....	....	
11,750	47,000	.001567	.000034	....	....	
12,000	48,000	.001600	.000033	....	....	
12,250	49,000	.001633	.000033	....	....	
12,500	50,000	.001667	.000034	....	....	
12,750	51,000	.001700	.000033	....	....	
13,000	52,000	.001733	.000033	....	....	
13,250	53,000	.001767	.000034	....	....	
13,500	54,000	.001800	.000033	....	....	
13,750	55,000	.001867	.000067	....	....	
14,000	56,000	.001933	.000066	....	....	Elastic limit.
14,250	57,000	.092033	.000100	....	....	
14,500	58,000	.005667	.003634	....	....	
14,750	59,000	.007100	.001433	....	....	
15,000	60,000	.008167	.001067	....	....	
15,250	61,000	.009000	.000833	....	....	
23,540	94,160	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	94,160
Elastic limit per square inch of original section	do...	56,000
Elongation per inch after rupture	inch..	.2133
Elongation per inch under strain at elastic limit	do...	.001933
Reduction in diameter at point of rupture	do...	.164
Reduction in area after rupture, per cent of original section		49.7
Position of rupture		1''.2 from neck
Character of broken surface		fine silky
Elongation of inch sections		''.11, ''.19, ''.84*

JACKET.

No. 5867.

Marks, $\substack{12\ M\ R_{45}\ J \\ B\ T_{1}\ O}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1, 000	0.	0.	0.	0.	Initial load.
1, 250	5, 000	.000100	.000100	0.	....	
2, 500	10, 000	.000267	.000167	....	....	
5, 000	20, 000	.000633	.000366	....	....	
7, 500	30, 000	.000967	.000334	....	....	
8, 750	35, 000	.001133	.000166	0.	....	
10, 000	40, 000	.001338	.000200	....	....	
10, 500	42, 000	.001400	.000067	0.	....	
10, 750	43, 000	.001467	.000067	....	....	
11, 000	44, 000	.001500	.000033	....	....	
11, 250	45, 000	.001567	.000067	....	....	
11, 500	46, 000	.001633	.000066	....	....	Elastic limit.
11, 750	47, 000	.012333	.010700	....	....	
12, 000	48, 000	.013167	.000834	....	....	
12, 250	49, 000	.013767	.000600	....	....	
12, 500	50, 000	.015133	.001366	....	....	
12, 750	51, 000	.015933	.000800	....	....	
21, 220	84, 880	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	84, 880
Elastic limit per square inch of original section	do...	46, 000
Elongation per inch after rupture	inch..	.2267
Elongation per inch under strain at elastic limit	do...	.001633
Reduction in diameter at point of rupture	do...	.155
Reduction in area after rupture, per cent of original section		47.2
Position of rupture		1″.3 from neck
Character of broken surface		fine silky
Elongation of inch sections		″.24, ″.81*, ″.13

JACKET.

No. 5846.

Marks, ${}^{9711\ B,}_{M\ T,\ M}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000100	.000100	0.		
2,500	10,000	.000267	.000167			
5,000	20,000	.000600	.000333			
7.500	30,000	.000933	.000333			
8,750	35,000	.001100	.000167	0.		
10,000	40,000	.001300	.000200			
10,500	42,000	.001367	.000067	.000033	.000033	
10,750	43,000	.001433	.000066			
11,000	44,000	.001467	.000034			
11,250	45,000	.001500	.000033			
11,500	46,000	.001567	.000067			Elastic limit.
11,750	47,000	.001700	.000133			
12,000	48,000	.002600	.000900			
12,250	49,000	.005333	.002733			
12,500	50,000	.006600	.001267			
12,750	51,000	.007333	.000733			
21,710	86,840					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	86,840
Elastic limit per square inch of original section	do...	46,000
Elongation per inch after rupture	inch..	.2333
Elongation per inch under strain at elastic limit	do...	.001567
Reduction in diameter at point of rupture	do...	.185
Reduction in area after rupture, per cent of original section		41.9
Position of rupture		1″.3 from neck
Character of broken surface		granular, 40 per cent; silky, 60 per cent
Elongation of inch sections		″.21, ″.34*, ″.15

JACKET.

No. 5915.

Marks, $\substack{10804\ \mathrm{B}\\ \mathrm{M\ T,\ M}}$
Diameter, ″.565.
Sectional area, .25 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000067	.000067	0.	....	
2,500	10,000	.000300	.000233	....	....	
5,000	20,000	.000600	.000300	....	....	
7,500	30,000	.000933	.000333	....	....	
8,750	35,000	.001100	.000167	0.	....	
10,000	40,000	.001300	.000200	....	....	
10,500	42,000	.001367	.000067	0.	....	
10,750	43,000	.001400	.000033	....	....	
11,000	44,000	.001433	.000033	....	....	
11,250	45,000	.001467	.000034	....	....	
11,500	46,000	.001500	.000033	....	....	Elastic limit.
11,750	47,000	.001600	.000100	....	....	
12,000	48,000	.002300	.000700	....	....	
12,250	49,000	.003167	.000867	....	....	
12,500	50,000	.005000	.001833	....	....	
12,750	51,000	.005967	.000967	....	....	
23,210	92,840	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	92,840
Elastic limit per square inch of original section	do...	46,000
Elongation per inch after rupture	inch..	.1667
Elongation per inch under strain at elastic limit	do...	.001500
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		39.2
Position of rupture		″.6 from neck
Character of broken surface		silky, oblique
Elongation of inch sections		″.10, ″.11, ″.29

TABULATION OF TENSION SPECIMENS FROM 12-INCH B. L. RIFLED MORTARS (STEMS 3" LONG, ".564 DIAMETER).

No. of test.	Position in gun.	Location of specimens.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation.	Contraction of area.	Appearance of fracture.	Remarks.
			Pounds.	*Pounds.*	*Pr. ct.*	*Pr. ct.*		
5724	Tube ...	Middle .	46,000	89,240	20.0	49.7	Silky	Breech end.
5746	....do ...	....do ...	48,000	86,360	22.0	49.7	.....do	Muzzle end.
5757	....do ...	....do ...	46,000	88,720	22.7	49.7	.....do	Breech end.
5760	....do ...	....do ...	44,000	86,720	21.0	49.7	.....do	Muzzle end.
5765	....do ...	Outside.	55,000	96,280	19.7	41.9	Silky, irregular surface .	Breech end.
5766	....do ...	Middle .	47,000	88,920	24.0	47.2	Silky	Muzzle end.
5773	....do ...	Outside.	52,000	92,320	20.3	47.2	.....do	Do.
5845	....do ...	....do ...	49,000	89,560	23.0	49.7	.....do	Breech end.
5850	....do ...	Middle .	51,000	92,400	19.3	33.5	Granular, flaky metal on one side.	Muzzle end.
5777	....do ...	....do ...	46,000	84,040	23.3	44.6	Silky	Do.
5797	....do ...	....do ...	50,000	89,240	23.3	49.7	.....do	Do.
5803	....do ...	Outside.	53,000	96,320	20.3	44.6	Silky, trace of granulation.	Do.
5812	....do ...	....do ...	43,000	89,680	21.3	33.5	Silky 40 per cent, granular 60 per cent.	Breech end.
5816	....do ...	Middle .	48,000	87,280	22.7	44.6	Silky	Do.
5857	....do ...	Outside.	55,000	91,920	22.3	47.2	Fine silky	Muzzle end.
5890	....do ...	Middle .	48,000	87,720	19.3	33.5	Granular 60 per cent, dull silky flaky 40 per cent.	Breech end.
5911	....do ...	....do ...	48,000	85,440	22.7	47.2	Silky	Muzzle end.
5967	....do ...	....do ...	43,000	85,240	23.3	49.7	.....do	Do.
5726	Jacket ..	....do ...	46,000	88,480	21.0	44.6	.....do	Breech end.
5758	....do ...	....do ...	47,000	90,240	21.7	49.7	.....do	Do.
5761	....do ...	....do ...	48,000	92,720	17.3	44.6	Fine silky	Do.
5768	....do ...	....do ...	47,000	92,960	21.7	47.2	Silky, irregular surface .	Do.
5782	....do ...	....do ...	47,000	92,360	20.0	47.2	Silky	Do.
5813	....do ...	Outside.	54,000	90,440	23.7	52.2	.....do	Do.
5817	....do ...	Middle .	49,000	92,880	20.3	44.6	.....do	Muzzle end.
5818	....do ...	Outside.	41,000	85,240	24.7	49.7	.....do	Do.
5859	....do ...	....do ...	39,000	84,920	23.0	44.6	.....do	Do.
5858	....do ...	....do ...	53,000	86,440	21.3	49.7	Fine silky	Do.
5865	....do ...	Middle .	48,000	94,880	18.0	39.2	Silky 50 per cent, granular 50 per cent.	Do.
5868	....do ...	Outside.	56,000	94,160	21.3	49.7	Fine silky	Breech end.
5867	....do ...	....do ...	46,000	84,880	22.7	47.2	.....do	Do.
5846	....do ...	Middle .	46,000	86,840	23.3	41.9	Granular 40 per cent, silky 60 per cent.	Muzzle end.
5915	....do ...	....do ...	46,000	92,840	16.7	39.2	Silky, oblique	Do.

RIFLE-BARREL STEEL, .30-CALIBER.

No. 5727.

Marks, 75–3.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.		
2,000	10,000	.000300	.000167			
4,000	20,000	.000633	.000333			
6,000	30,000	.000967	.000334			
8,000	40,000	.001333	.000366			
10,000	50,000	.001667	.000334			
12,000	60.000	.002033	.000366	0.		
13,000	65,000	.002200	.000167			
14,000	70,000	.002367	.000167			
14,200	71,000	.002400	.000033			
14.400	72,000	.002433	.000033			
14,600	73,000	.002500	.000067			
14,800	74,000	.002567	.000067			
15,000	75,000	.002633	.000066			Elastic limit.
15,200	76,000	.003167	.000534			
						Load fell.
14,200	71.000	.003700	.000533			
14,400	72,000	.004500	.000800			
14,600	73,000	.007667	.003167			
14,800	74.000	.009000	.001333			
15,000	75,000	.010000	.001000			
15.200	76.000	.010267	.000267			
15,400	77,000	.011000	.000733			
15,600	78,000	.011600	.000600			
16,000	80,000	.013333	.001733			
16.400	82,000	.014833	.001500			
16,800	84,000	.016100	.001267			
17,600	88,000	.019500	.003400			
18,400	92,000	.022500	.003000			
19,200	96,000	.026733	.004233			
20,000	100,000	.0307	.003967			
20,800	104,000	.0360	.0053			
21,600	108,000	.0410	.0050			
22,400	112,000	.0487	.0077			
23,200	116,000	.0583	.0096			
24,000	120,000	.0827	.0244			
24,230	121,150	.1033	.0206			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	121,150
Elastic limit per square inch of original section	do...	75,000
Elongation per inch after rupture	inch..	.1867
Elongation per inch under strain at elastic limit	do...	.002633
Reduction in diameter at point of rupture	do. .	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		1″.5 from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		″.13, ″.31″, ″.12

No. 5728.

Marks, 75-S.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000138	.000133	0.	....	
2, 000	10, 000	.000300	.000167	....	....	
4, 000	20, 000	.000633	.000333	....	....	
6, 000	30, 000	.001000	.000367	....	....	
8, 000	40, 000	.001333	.000333	....	....	
10, 000	50, 000	.001667	.000334	....	....	
12, 000	60, 000	.002033	.000366	.000038	.000033	
14, 000	70, 000	.002367	.000334	....	....	
14. 800	74, 000	.002467	.000100	....	....	Elastic limit.
15. 000	75, 000	.002567	.000100	....	....	
15, 200	76, 000	....	....	....	....	Load fell.
14, 000	70, 000	.003733	.001166	....	....	
14, 200	71, 000	.004967	.001234	....	....	
14, 400	72, 000	.005867	.000900	....	....	
14, 600	73, 000	.008000	.002133	....	....	
14, 800	74, 000	.009867	.001867	....	....	
15, 000	75, 000	.010333	.000466	....	....	
15, 200	76, 000	.010867	.000534	....	....	
15, 400	77, 000	.011433	.000566	....	....	
15, 600	78, 000	.012167	.000734	....	....	
16. 000	80, 000	.013333	.001166	....	....	
16, 800	84, 000	.017067	.003734	....	....	
17, 600	88, 000	.020500	.003433	....	....	
18, 400	92, 000	.024600	.004100	....	....	
19, 200	96, 000	.028333	.003733	....	....	
20, 000	100, 000	.0337	.005367	....	....	
20, 800	104, 000	.0397	.0060	....	....	
21, 600	108, 000	.0467	.0070	....	....	
22, 400	112, 000	.0567	.0100	....	....	
23, 200	116, 000	.0783	.0216	....	....	
23, 610	118, 050	.1133	.0350	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	118, 050
Elastic limit per square inch of original section	do...	74, 000
Elongation per inch after rupture	inch..	.1900
Elongation per inch under strain of elastic limit	do...	.002467
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		1″.8 from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		″.17, ″.30*, ″.10

No. 5729.

Marks, 76.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	....	
2,000	10,000	.000300	.000167	....	....	
4,000	20,000	.000633	.000333	....	....	
6,000	30,000	.000967	.000334	....	....	
8,000	40,000	.001300	.000333	....	....	
10,000	50,000	.001633	.000333	0.	....	
12,000	60,000	.001967	.009334	....	....	
14,000	70,000	.002333	.000366	....	....	
15,000	75,000	.002533	.000200	....	....	Elastic limit. Load fell.
14,200	71,000	.003733	.001200	....	....	
14,400	72,000	.004333	.000600	....	....	
14,600	73,000	.008667	.004334	....	....	
14,800	74,000	.009100	.000433	....	....	
15,000	75,000	.009367	.000267	....	....	
15,200	76,000	.010333	.000966	....	....	
15,400	77,000	.011000	.000667	....	....	
15 600	78,000	.011667	.000667	....	....	
15,800	79,000	.012600	.000933	....	....	
16,000	80,000	.013167	.000567	....	....	
16,800	84,000	.0167	.003533	....	....	
17,600	88,000	.0203	.0036	....	....	
18,400	92.000	.0233	.0030	....	....	
19,200	96,000	.0273	.0040	....	....	
20,000	100,000	.0323	.0050	....	....	
20,800	104,000	.0377	.0054	....	....	
21,600	108,000	.0444	.0067	....	....	
22.400	112.000	.0563	.0119	....	....	
23,200	116,000	.0767	.0204	....	....	
23,540	117,700	.1000	.0233	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	117,700
Elastic limit per square inch of original section	do...	75,000
Elongation per inch after rupture	inch..	.1867
Elongation per inch under strain at elastic limit	do...	.002533
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		1″.3 from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		″.18, ″.28*, ″.10

SANDERSON–ENGLISH.

No. 5730.

Marks, 77.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	....	
2,000	10,000	.000300	.000167	....	....	
4,000	20,000	.000667	.000367	....	....	
6,000	30,000	.001000	.000333	....	....	
8,000	40,000	.001367	.000367	....	....	
10,000	50,000	.001700	.000333	0.	....	
12,000	60,000	.002067	.000367	....	....	Elastic limit.
						Load fell.
11,000	55,000	.002933	.000866	....	....	
11,200	56,000	.016000	.013067	....	....	
11,400	57,000	.016567	.000567	....	....	
11,600	58,000	.017033	.000466	....	....	
11,800	59,000	.017833	.000800	....	....	
12,000	60,000	.018767	.000934	....	....	
12,200	61,000	.019733	.000966	....	....	
12,400	62,000	.020733	.001000	....	....	
12,600	63,000	.0220	.001267	....	....	
12,800	64,000	.0233	.0013	....	....	
13,200	66,000	.0257	.0024	....	....	
13,600	68,000	.0287	.0030	....	....	
14,000	70,000	.0313	.0026	....	....	
14,400	72,000	.0353	.0040	....	....	
15,200	76,000	.0423	.0070	....	....	
16,000	80,000	.0520	.0097	....	....	
16,400	82,000	.0580	.0060	....	....	
16,800	84,000	.0667	.0087	....	....	
17,200	86,000	.0800	.0133	....	....	
17,600	88,000	.0933	.0133	....	....	
18,000	90,000	.1233	.0300	....	....	
18,130	90,650	.1500	.0267	....	....	Tensile strength. Elongation of inch sections under maximum stress, ″.16, ″.17, ″.15.

General summary.

Tensile strength per square inch of original section	pounds..	90,650
Elastic limit per square inch of original section	do...	60,000
Elongation per inch after rupture	inch..	.2300
Elongation per inch under strain at elastic limit	do...	.002067
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		40.3
Position of rupture		1″.23 from neck
Character of broken surface		silky, interspersed with fine granulation: cup shaped.
Elongation of inch sections		″.23, ″.31*, ″.15

SANDERSON-AMERICAN.

No. 5731.

Marks, S-1.
Diameter, ''.505.
Sectional area, .20 square inch.
Gauged length, 3''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000183	.000133	0.		
2,000	10,000	.000333	.000200			
4,000	20,000	.000633	.000300			
6,000	30,000	.001000	.000367			
8,000	40,000	.001333	.000333			
10,000	50,000	.001667	.000334	0.		
12,000	60,000	.002033	.000366			
13,000	65,000	.002267	.000234			
13,200	66,000	.002300	.000033			
13,400	67,000	.002333	.000033			Elastic limit.
						Load fell.
12,400	62,000	.003767	.001434			
12,600	63,000	.004500	.000733			
12,800	64,000	.006667	.002167			
13,000	65,000	.009167	.002500			
13,200	66,000	.009667	.000500			
13,400	67,000	.010333	.000666			
13,600	68,000	.010800	.000467			
13,800	69,000	.011433	.000633			
14,000	70,000	.012067	.000634			
14,400	72,000	.013600	.001533			
14,800	74,000	.014667	.001067			
15,200	76,000	.016000	.001333			
16,000	80,000	.019433	.003433			
16,800	84,000	.022000	.002567			
17,600	88,000	.026000	.004000			
18,400	92,000	.029667	.003667			
19,200	96,000	.035000	.005333			
20,000	100,000	.0400	.0050			
20,800	104,000	.0477	.0077			
21,600	108,000	.0583	.0106			
22,000	110,000	.0667	.0084			
22,400	112,000	.0800	.0133			
22,790	113,950	.1233	.0433			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	113,950
Elastic limit per square inch of original section	do...	67,000
Elongation per inch after rupture	inch..	.1767
Elongation per inch under strain at elastic limit	do...	.002333
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per cent of original section		30.7
Position of rupture		1''.4 from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		''.16, ''.26*, ''.11

FROM FORGED FORM FOR BARREL.

No. 5752.

Marks, A I.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000600	.000300	....	....	
6,000	30,000	.000933	.000333	....	....	
8,000	40,000	.001267	.000334	....	....	
10,000	50,000	.001633	.000366	0.	....	
12,000	60,000	.001967	.000334	....	....	
13,000	65,000	.002100	.000133	....	....	
14,000	70,000	.002300	.000200	....	....	
14,200	71,000	.002333	.000033	....	....	
14,400	72,000	.002367	.000034	....	....	
14,600	73,000	.002400	.000033	....	....	
14,800	74,000	.002433	.000033	....	....	
15,000	75,000	.002467	.000034	....	....	Elastic limit.
15,200	76,000	{ .002533	.000066	....	....	
		.003667	.001134	....	....	
15,400	77,000	.004433	.000766	....	....	
15,600	78,000	.005667	.001234	....	....	
15,800	79,000	.006667	.001000	....	....	
16,000	80,000	.007867	.001200	....	....	
16,400	82,000	.010400	.002533	....	....	
16,800	84,000	.011833	.001433	....	....	
17,200	86,000	.013767	.001934	....	....	
17,600	88,000	.015500	.001733	....	....	
18,000	90,000	.017467	.001967	....	....	
18,400	92,000	.019433	.001966	....	....	
19,200	96,000	.023767	.004334	....	....	
20,000	100,000	.028867	.005100	....	....	
20,800	104,000	.034067	.005200	....	....	
21,600	108,000	.041000	.006933	....	....	
22,400	112,000	.050000	.009000	....	....	
23,200	116,000	.0633	.0133	....	....	
23,790	118,950	.1100	.0467	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	118,950
Elastic limit per square inch of original section	do	75,000
Elongation per inch after rupture	inch	.1767
Elongation per inch under strain at elastic limit	do	.002467
Reduction in diameter at point of rupture	do	.155
Reduction in area after rupture, per cent of original section		51.9
Position of rupture		1″ from neck
Character of broken surface		fine silky, dark gray, serrated edges
Elongation of inch sections		″.30, ″.14, ″.09

FROM FORGED FORM FOR BARREL.

No. 5753.

Marks, A I.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.		
2,000	10,000	.000300	.000167			
4,000	20,000	.000633	.000333			
6,000	30,000	.000967	.000334			
8,000	40,000	.001300	.000333			
10,000	50,000	.001667	.000367	0.		
12,000	60,000	.002000	.000333			
13,000	65,000	.002167	.000167			
14,000	70,000	.002367	.000200			
14,200	71,000	.002367	0.			
14,400	72,000	.002400	.000033			
14,600	73,000	.002467	.000067			
14,800	74,000	.002500	.000033			
15,000	75,000	.002533	.000033			
15,200	76,000	.002567	.000034			
15,400	77,000	.002600	.000033			
15,600	78,000	.002633	.000033			
15,800	79,000	.002700	.000067			
16,000	80,000	.002733	.000033			
16,200	81,000	.002767	.000034			
16,400	82,000	.002800	.000033			Elastic limit. Load fell.
16,600	83,000	.014667	.011867			
16,800	84,000	.015733	.001066			
17,000	85,000	.016600	.000867			
17,200	86,000	.017867	.001267			
17,600	88,000	.020500	.002633			
18,400	92,000	.027067	.006567			
19,200	96,000	.032833	.005766			
20,000	100,000	.041500	.008667			
20,800	104,000	.050667	.009167			
21,600	108,000	.0700	.019333			
21,940	109,700	.1133	.0433			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	109,700
Elastic limit per square inch of original section	do	82,000
Elongation per inch after rupture	inch	.1833
Elongation per inch under strain at elastic limit	do	.002800
Reduction in diameter at point of rupture	do	.125
Reduction in area after rupture, per cent of original section		48.3
Position of rupture		1″.23 from neck
Character of broken surface		fine silky, dark gray, irregular surface
Elongation of inch sections		″.23*, ″.22*, ″.10

No. 5763.

Marks, S.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	....	
2,000	10,000	.000300	.000167	....	....	
4,000	20,000	.000633	.000338	....	....	
6,000	30,000	.001000	.000367	....	....	
8,000	40,000	.001333	.000333	....	....	
10,000	50.000	.001700	.000367	.000033	.000033	
11,000	55,000	.001867	.000167	....	....	
12,000	60,000	.002033	.000166	....	....	
13,000	65,000	.002233	.000200	....	....	
14,000	70,000	.002400	.000167	.000033	0.	
15,000	75,000	.002600	.000200	....	....	Elastic limit.
15,200	76,000	.002667	.000067	....	....	
						Load fell.
14,600	73,000	.007667	.005000	....	....	
14,800	74,000	.009600	.001933	....	....	
15,000	75,000	.010167	.000567	....	....	
15,200	76.000	.011067	.000900	....	....	
15,600	78,000	.012267	.001200	....	....	
16,000	80,000	.013467	.001200	....	....	
16,800	84,000	.016933	.003466	....	....	
17,600	88,000	.020133	.003200	....	....	
18,400	92,000	.023767	.003634	....	....	
19,200	96,000	.027833	.004066	....	....	
20.000	100,000	.032167	.004334	....	....	
20,800	104,000	.037333	.005166	....	....	
21,600	108,000	.043500	.006167	....	....	
22,400	112,000	.051500	.008000	....	....	
23,200	116,000	.0667	.0152	....	....	
24,000	120,000	.1067	.0400	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds..	120,000
Elastic limit per square inch of original section .... do...	75,000
Elongation per inch after rupture .... inch..	.1733
Elongation per inch under strain at elastic limit .... do...	.002600
Reduction in diameter at point of rupture .... do...	.115
Reduction in area after rupture, per cent of original section	40.3
Position of rupture	1″.56 from neck
Character of broken surface	fine silky, trace of granulation
Elongation of inch sections	″.11, ″.29*, ″.12

No. 5776.

Marks, 78.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000633	.000333	....	....	
6,000	30,000	.000967	.000334	....	....	
8,000	40,000	.001300	.000333	....	....	
10,000	50,000	.001633	.000333	0.	....	
11,000	55,000	.001800	.000167	....	....	
12,000	60,000	.001967	.000167	....	....	
13,000	65,000	.002133	.000166	....	....	
14,000	70,000	.002333	.000200	0.	....	Elastic limit.
14,200	71,000	.002833	.000500	....	....	
						Load fell.
13,600	68,000	.003300	.000467	....	....	
13,800	69,000	.006100	.002800	....	....	
14,000	70,000	.008033	.001933	....	....	
14,400	72,000	.009333	.001300	....	....	
14,800	74,000	.010833	.001500	....	....	
15,200	76,000	.012000	.001167	....	....	
15,600	78,000	.013667	.001667	....	....	
16,000	80,000	.015167	.001500	....	....	
16,800	84,000	.018333	.003166	....	....	
17,600	88,000	.022000	.003667	....	....	
18,400	92,000	.025667	.003667	....	....	
19,200	96,000	.030067	.004400	....	....	
20,000	100,000	.035100	.005033	....	....	
20,800	104,000	.041000	.005900	....	....	
21,600	108,000	.048000	.007000	....	....	
22,400	112,000	.059833	.011833	....	....	
23,280	116,400	.1100	.050167	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section....pounds..	116,400
Elastic limit per square inch of original section....do...	70,000
Elongation per inch after rupture....inch..	.1900
Elongation per inch under strain at elastic limit....do...	.002333
Reduction in diameter at point of rupture....do...	.145
Reduction in area after rupture, per cent of original section....	49.1
Position of rupture....	1″.5 from neck
Character of broken surface....	fine silky, cup shaped
Elongation of inch sections....	″.11, ″.32*, ″.14

No. 5785.

Marks, 79.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.		
2,000	10,000	.000300	.000200			
4,000	20,000	.000633	.000333			
6,000	30,000	.000967	.000334			
8,000	40,000	.001333	.000366			
10,000	50,000	.001667	.000334	0.		
12,000	60,000	.002033	.000366			
12,800	64,000	.002167	.000134			Elastic limit. Load fell.
11,400	57,000	.003333	.001166			
11,600	58,000	.008400	.005067			
11,800	59,000	.010200	.001800			
12,000	60,000	.010833	.000633			
12,200	61,000	.011633	.000800			
12,400	62,000	.012267	.000634			
12,600	63,000	.012833	.000566			
12,800	64,000	.013833	.001000			
13,200	66,000	.015733	.001900			
13,600	68,000	.017367	.001634			
14,000	70,000	.019733	.002366			
14,400	72,000	.021667	.001934			
15,200	76,000	.025833	.004166			
16,000	80,000	.031600	.005767			
16,800	84,000	.037400	.005800			
17,600	88,000	.043667	.006267			
18,400	92,000	.053833	.010166			
19,200	96,000	.063000	.009167			
20,000	100,000	.0967	.0337			
20,330	101,650	.1433	.0466			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	101,650
Elastic limit per square inch of original section	do...	64,000
Elongation per inch after rupture	inch..	.2267
Elongation per inch under strain at elastic limit	do...	.002167
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		1″.7 from neck
Character of broken surface		silky
Elongation of inch sections		″.15, ″.38*, ″.15

No. 5805.

Marks, 78.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	.0	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000267	.000167	....	....	
4,000	20,000	.000633	.000366	....	....	
6,000	30,000	.000933	.000300	....	....	
8,000	40,000	.001267	.000334	....	....	
10,000	50,000	.001600	.000333	0.	....	
11,000	55,000	.001767	.000167	....	....	
12,000	60,000	.001933	.000166	....	....	
13,000	65,000	.002133	.000200	....	....	
13,800	69,000	.002300	.000167	....	....	Elastic limit.
14,000	70,000	.003000	.000700	....	....	
						Load fell.
13,000	65,000	.003333	.000333	....	....	
13,200	66,000	.004000	.000667	....	....	
13,400	67,000	.008000	.004000	....	....	
13,600	68,000	.010367	.002367	....	....	
13,800	69,000	.011000	.000633	....	....	
14,000	70,000	.011500	.000500	....	....	
14,400	72,000	.013000	.001500	....	....	
14,800	74,000	.014667	.001667	....	....	
15,200	76,000	.016167	.001500	....	....	
15,600	78,000	.017767	.001600	....	....	
16,000	80,000	.020300	.002533	....	....	
16,800	84,000	.024000	.003700	....	....	
17,600	88,000	.028667	.004667	....	....	
18,400	92,000	.033333	.004666	....	....	
19,200	96,000	.039833	.006500	....	....	
20,000	100,000	.047500	.007667	....	....	
20,800	104,000	.0600	.0125	....	....	
21,600	108,000	.0800	.0200	....	....	
22,240	111,200	.1367	.0567	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	**pounds**	**111,200**
Elastic limit per square inch of original section	**do**	**69,000**
Elongation per inch after rupture	**inch**	**.2133**
Elongation per inch under strain at elastic limit	**do**	**.002300**
Reduction in diameter at point of rupture	**do**	**.145**
Reduction in area after rupture, per cent of original section		**49.1**
Position of rupture		**at middle of stem**
Character of broken surface		**silky**
Elongation of inch sections		**″.14, ″.86*, ″.14**

No. 5831.

Marks, 78-2.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.		
2,000	10,000	.000267	.000167			
4,000	20,000	.000600	.000333			
6,000	30,000	.000933	.000333			
8,000	40,000	.001300	.000367	0.		
10,000	50,000	.001667	.000367			
11,000	55,000	.001867	.000200			
12,000	60,000	.002033	.000166			
14,000	70,000	.002400	.000367			
14,200	71,000	.002433	.000033			Elastic limit.
						Load fell.
13,400	67,000	.003733	.001300			
13,600	68,000	.005067	.001334			
13,800	69,000	.007667	.002600			
14,000	70,000	.009500	.001833			
14,200	71,000	.010000	.000500			
14,400	72,000	.010367	.000367			
15,200	76,000	.013767	.003400			
16,000	80,000	.016800	.003033			
16,800	84,000	.019667	.002867			
17,600	88,000	.023733	.004066			
18,400	92,000	.026833	.003100			
19,200	96,000	.032000	.005167			
20,000	100,000	.036333	.004333			
20,800	104,000	.041833	.005500			
21,600	108,000	.051667	.009834			
23,620	118,100					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	118,100
Elastic limit, per square inch of original section	do...	71,000
Elongation per inch after rupture	inch..	.1700
Elongation per inch under strain at elastic limit	do...	.002433
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		1″ from neck
Character of broken surface		fine silky
Elongation of inch sections		″.29*, ″.13, ″.09

BARREL STEEL.

No. 5872.

Marks, 78.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000333	.000233	....	....	
4,000	20,000	.000600	.000267	....	....	
6,000	30,000	.000967	.000367	....	....	
8,000	40,000	.001300	.000333	....	....	
10,000	50,000	.001667	.000367	0.	....	
11,000	55,000	.001800	.000133	....	....	
12,000	60,000	.002000	.000200	....	....	
13,000	65,000	.002133	.000133	....	....	
14,000	70,000	.002333	.000200	....	....	
14,200	71,000	.002367	.000034	....	....	Elastic limit.
14,400	72,000	.002833	.000466	....	....	
						Load fell.
13,600	68,000	.003167	.000334	....	....	
13,800	69,000	.004600	.001433	....	....	
14,000	70,000	.009333	.004733	....	....	
14,200	71,000	.009533	.000200	....	....	
14,400	72,000	.009900	.000367	....	....	
14,800	74,000	.011500	.001600	....	....	
15,200	76,000	.012933	.001433	....	....	
15,600	78,000	.014100	.001167	....	....	
16,000	80,000	.015933	.001833	....	....	
16,800	84,000	.019767	.003834	....	....	
17,600	88,000	.022367	.002600	....	....	
18,400	92,000	.026333	.003966	....	....	
19,200	96,000	.030700	.004367	....	....	
20,000	100,000	.036267	.005567	....	....	
20,800	104,000	.042333	.006066	....	....	
21,600	108,000	.049333	.007000	....	....	
22,400	112,000	.059667	.010334	....	....	
23,200	116,000	.0800	.020333	....	....	
23,610	118,050	.1200	.0400	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds..	118,050
Elastic limit per square inch of original section .... do...	71,000
Elongation per inch after rupture .... inch..	.1867
Elongation per inch under strain at elastic limit .... do...	.002367
Reduction in diameter at point of rupture .... do...	.115
Reduction in area after rupture, per cent of original section	40.3
Position of rupture	1.″21 from neck
Character of broken surface	fine silky, cup shaped
Elongation of inch sections	″.12, ″.23*, ″.21*

BARREL STEEL, ROLLED (FROM BUTT).

No. 5873.

Marks, 78 F.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000067	.000067	0.	....	
2,000	10,000	.000267	.000200	....	....	
4,000	20,000	.000600	.000333	....	....	
6,000	30,000	.000933	.000333	....	....	
8,000	40,000	.001267	.000334	....	....	
10,000	50,000	.001633	.000366	0.	....	
10,200	51,000	.001700	.000067	....	....	Elastic limit.
10,400	52,000	.005333	.003633	....	....	
10,600	53,000	.007067	.001734	....	....	
10,800	54,000	.007700	.000633	....	....	
11,000	55,000	.008300	.000600	....	....	
11,200	56,000	.008933	.000633	....	....	
11,400	57,000	.009500	.000567	....	....	
11,600	58,000	.010000	.000500	....	....	
11,800	59,000	.010733	.000733	....	....	
12,000	60,000	.011667	.000934	....	....	
12,400	62,000	.012933	.001266	....	....	
12,800	64,000	.014167	.001234	....	....	
13,600	68,000	.017333	.003166	....	....	
14,400	72,000	.020500	.003167	....	....	
15,200	76,000	.024000	.003500	....	....	
16,000	80,000	.028600	.004600	....	....	
16,800	84,000	.032333	.003733	....	....	
17,600	88,000	.037500	.005167	....	....	
18,400	92,000	.045000	.007500	....	....	
19,200	96,000	.054767	.009767	....	....	
20,000	100,000	.067667	.012900	....	....	
20,800	104,000	.1100	.042333	....	....	
20,840	104,200	.1267	.0167	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	104,200
Elastic limit per square inch of original section	do...	51,000
Elongation per inch after rupture	inch..	.1667
Elongation per inch under strain at elastic limit	do...	.001700
Reduction in diameter at point of rupture	do...	.075
Reduction in area after rupture, per cent of original section		27.4
Position of rupture		1.″ from neck
Character of broken surface		fine granular, silky center
Elongation of inch sections		.″11, .″16, .″23*

REAMED BARREL.

No. 5876.

Marks, 78.
Hollow specimen.
Exterior diameter, ''.588.
Diameter of bore, ''.300.
Sectional area, .20 square inch.
Gauged length, 3''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000067	.000067	0.	....	
2,000	10,000	.000300	.000233	....	....	
4,000	20,000	.000667	.000367	....	....	
6,000	30,000	.001033	.000366	....	....	
7,800	39,000	....	....	....	....	Elastic limit, approximate. Not well defined.
8,000	40,000	.001467	.000434	.000200	.000200	
9,000	45,000	.001867	.000400	.000400	.000200	
9,200	46,000	.002200	.000333	....	....	
9,400	47,000	.002400	.000200	....	....	
9,600	48,000	.002967	.000567	....	....	
9,800	49,000	.004333	.001366	....	....	
10,000	50,000	.006667	.002334	....	....	
10,400	52,000	.011333	.004666	....	....	
10,800	54,000	.012400	.001067	....	....	
11,200	56,000	.014000	.001600	....	....	
11,600	58,000	.015833	.001833	....	....	
12,000	60,000	.017667	.001834	....	....	
12,400	62,000	.019667	.002000	....	....	
12,800	64,000	.022033	.002366	....	....	
13,200	66,000	.024333	.002300	....	....	
13,600	68,000	.026433	.002100	....	....	
14,400	72,000	.031833	.005400	....	....	
15,200	76,000	.038000	.006167	....	....	
16,000	80,000	.045000	.007000	....	....	
16,800	84,000	.055667	.010667	....	....	
17,600	88,000	.073167	.017500	....	....	
18,400	92,000	.111667	.038500	....	....	
18,520	92,600	.147333	.035666	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	92,600
Elastic limit per square inch of original section (approximate)	do...	39,000
Elongation per inch after rupture	inch..	.2167
Reduction in diameter at point of rupture (exterior)	do...	.118
Position of rupture		1''.4 from neck
Character of broken surface		silky
Elongation of inch sections		''.14, ''.31*, ''.20

REAMED BARREL.

No. 5877.

Marks, 78.
Hollow specimen.
Exterior diameter, ″.588.
Diameter of bore, ″.300.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000100	.000100	0.	....	
2, 000	10, 000	.000300	.000200	....	....	
4, 000	20, 000	.000667	.000367	....	....	
6, 000	30, 000	.001000	.000333	0.	....	
7, 000	35, 000	.001233	.000233	....	....	
7, 200	36, 000	.001267	.000034	....	....	
7, 400	37, 000	.001333	.000066	....	....	
7, 600	38, 000	.001333	0.	....	....	
7, 800	39, 000	.001367	.000034	....	....	
8, 000	40, 000	.001400	.000033	.000133	.000133	
8, 200	41, 000	.001500	.000100	....	....	
8, 400	42, 000	.001567	.000067	....	....	
8, 600	43, 000	.001633	.000066	....	....	
8, 800	44, 000	.001667	.000034	....	....	
9, 000	45, 000	.001700	.000033	.000200	.000067	
9, 200	46, 000	.001733	.000033	....	....	
9, 400	47, 000	.001767	.000034	....	....	
9, 600	48, 000	.001833	.000066	....	....	
9, 800	49, 000	.001933	.000100	....	....	No well-defined elastic limit.
10, 000	50, 000	.001967	.000034	.000300	.000100	
10, 200	51, 000	.002033	.000066	....	....	
10, 400	52, 000	.002067	.000034	....	....	Rapid stretching begins.
10, 600	53, 000	.002200	.000133	....	....	
10, 800	54, 000	.002367	.000167	....	....	
11, 000	55, 000	.003033	.000666	.001167	.000867	
11, 200	56, 000	.005000	.001967	....	....	
11, 400	57, 000	.006600	.001600	....	....	
11, 600	58, 000	.013100	.006500	....	....	
11, 800	59, 000	.013533	.000433	....	....	
12, 000	60, 000	.014267	.000734	....	....	
12, 400	62, 000	.015867	.001600	....	....	
12, 800	64, 000	.017167	.001300	....	....	
13, 200	66, 000	.018933	.001766	....	....	
13, 600	68, 000	.020667	.001734	....	....	
14, 400	72, 000	.025333	.004666	....	....	
15, 200	76, 000	.029667	.004334	....	....	
16, 000	80, 000	.035667	.006000	....	....	
16, 800	84, 000	.042167	.006500	....	....	
17, 600	88, 000	.051667	.009500	....	....	
18, 400	92, 000	.063067	.011400	....	....	
19, 200	96, 000	.084000	.020933	....	....	
19, 840	99, 200	.143333	.059333	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	99, 200
Elastic limit per square inch of original section		not well defined
Elongation per inch after rupture	inch..	.2100
Reduction in diameter at point of rupture (exterior)	do...	.128
Position of rupture		1″.7 from neck
Character of broken surface		fine silky
Elongation of inch sections		″.15, ″.35*, ″.13

REAMED BARREL, OIL TEMPERED.

No. 5878.

Marks, 78 T.
Hollow specimen.
Exterior diameter, ″.588.
Diameter of bore, ″.300.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000100	.000100	0.	....	
2, 000	10, 000	.000300	.000200	....	....	
4, 000	20, 000	.000667	.000367	....	....	
6, 000	30, 000	.001000	.000333	.000033	.000033	
7, 000	35, 000	.001233	.000233	.000033	0.	
7, 200	36, 000	.001233	0.	....	....	
7, 400	37, 000	.001300	.000067	....	....	
7, 600	38, 000	.001333	.000033	....	....	
7, 800	39, 000	.001333	0.	....	....	
8, 000	40, 000	.001367	.000034	.000067	.000034	
8, 200	41, 000	.001433	.000066	....	....	
8, 400	42, 000	.001533	.000100	....	....	
8, 600	43, 000	.001600	.000067	....	....	
8, 800	44, 000	.001667	.000067	....	....	No well-defined elastic limit.
9, 000	45, 000	.001700	.000033	.000267	.000200	
9, 200	46, 000	.001867	.000167	....	....	Rapid stretching begins.
9, 400	47, 000	.001967	.000100	....	....	
9, 600	48, 000	.002167	.000200	....	....	
9, 800	49, 000	.002433	.000266	....	....	
10, 000	50, 000	.002800	.000367	.001033	.000766	
10, 200	51, 000	.003033	.000233	....	....	
10, 400	52, 000	.003267	.000234	....	....	
10, 600	53, 000	.003633	.000366	....	....	
10, 800	54, 000	.003867	.000234	....	....	
11, 000	55, 000	.004167	.000300	....	....	
11, 200	56, 000	.004667	.000500	....	....	
11, 400	57, 000	.004933	.000266	....	....	
11, 600	58, 000	.005167	.000234	....	....	
11, 800	59, 000	.005633	.000466	....	....	
12, 000	60, 000	.005933	.000300	....	....	
12, 400	62, 000	.006600	.000667	....	....	
12, 800	64, 000	.007300	.000700	....	....	
13, 200	66, 000	.008033	.000733	....	....	
13, 600	68, 000	.008967	.000934	....	....	
14, 400	72, 000	.010833	.001866	....	....	
15, 200	76, 000	.013400	.002567	....	....	
16, 000	80, 000	.016167	.002767	....	....	
16, 800	84, 000	.019200	.003033	....	....	
17, 600	88, 000	.024000	.004800	....	....	
18, 400	92, 000	.028333	.004833	....	....	
19, 200	96, 000	.035833	.007500	....	....	
20, 000	100, 000	.048000	.012167	....	....	
20, 380	101, 900	.0667	.0187	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section......pounds..	101, 900
Elastic limit per square inch of original section......	not well defined
Elongation per inch after rupture......inch..	.0667
Reduction in diameter at point of rupture (exterior)......do...	.088
Position of rupture......	″.15 from neck
Character of broken surface......	fine granular, 65 per cent; silky, 35 per cent
Elongation of inch sections......	″.17*, ″.02, ″.01

REAMED BARREL, OIL TEMPERED.

No. 5879.

Marks, 78 T.
Hollow specimen.
Exterior diameter, ″.588.
Diameter of bore, ″.300.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000067	.000067	0.	....	
2,000	10,000	.000267	.000200	....	....	
4,000	20,000	.000567	.000300	....	....	
6,000	30,000	.000900	.000333	0.	....	
7,000	35,000	.001067	.000167	0.	....	
8,000	40,000	.001233	.000166	0.	....	
8,200	41,000	.001267	.000034	....	....	
8,400	42,000	.001300	.000033	....	....	
8,600	43,000	.001333	.000033	....	....	
8,800	44,000	.001367	.000034	....	....	
9,000	45,000	.001400	.000033	0.	....	
9,200	46,000	.001433	.000033	....	....	
9,400	47,000	.001467	.000034	....	....	
9,600	48,000	.001500	.000033	....	....	
9,800	49,000	.001567	.000067	....	....	
10,000	50,000	.001633	.000066	0.	....	
10,200	51,000	.001700	.000067	....	....	
10,400	52,000	.001733	.000033	....	....	
10,600	53,000	.001767	.000034	....	....	Elastic limit.
10,800	54,000	.002033	.000266	....	....	
11,000	55,000	.011633	.009600	.009500	.000500	
11,200	56,000	.012000	.000367	....	....	
11,400	57,000	.012607	.000667	....	....	
11,600	58,000	.013667	.001000	....	....	
11,800	59,000	.015000	.001333	....	....	
12,000	60,000	.016067	.001067	....	....	
12,400	62,000	.017667	.001600	....	....	
12,800	64,000	.019733	.002066	....	....	
13,200	66,000	.022833	.003100	....	....	
13,600	68,000	.024333	.001500	....	....	
14,400	72,000	.029667	.005334	....	....	
15,200	76,000	.036000	.006333	....	....	
16,000	80,000	.042667	.006667	....	....	
16,800	84,000	.052000	.009333	....	....	
17,600	88,000	.065833	.013833	....	....	
18,400	92,000	.088333	.022500	....	....	
19,120	95,600	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	95,600
Elastic limit per square inch of original section	do...	53,000
Elongation per inch after rupture	inch..	.2133
Elongation per inch under strain at elastic limit	do...	.001767
Reduction in diameter at point of rupture (exterior)	do...	.108
Position of rupture		1″.6 from neck
Character of broken surface		silky
Elongation of inch sections		″.14, ″.33*, ″.17

BARREL STOCK.

No. 5901.

Marks, 78.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000667	.000367	....	....	
6,000	30,000	.001033	.000366	....	....	
8,000	40,000	.001367	.000334	....	....	
10,000	50,000	.001700	.000333	.000033	.000033	
12,000	60,000	.002067	.000367	....	....	
13,000	65,000	.002267	.000200	....	....	
14,000	70,000	.002433	.000166	....	....	
14,200	71,000	.002467	.000034	....	....	Elastic limit.
14,400	72,000	.002567	.000100	....	....	
						Load fell.
13,000	65,000	.003633	.001066	....	....	
13,200	66,000	.004400	.000767	....	....	
13,400	67,000	.011267	.006867	....	....	
13,600	68,000	.011667	.000400	....	....	
13,800	69,000	.012267	.000600	....	....	
14,000	70,000	.013000	.000733	....	....	
14,400	72,000	.014333	.001333	....	....	
14,800	74,000	.016000	.001667	....	....	
15,200	76,000	.017733	.001733	....	....	
15,600	78,000	.019667	.001934	....	....	
16,000	80,000	.021333	.001666	....	....	
16,800	84,000	.025333	.004000	....	....	
17,600	88,000	.030333	.005000	....	....	
18,400	92,000	.035000	.004667	....	....	
19,200	96,000	.041667	.006667	....	....	
20,000	100,000	.049000	.007333	....	....	
20,800	104,000	.060667	.011667	....	....	
21,600	108,000	.0833	.022633	....	....	
22,120	110,600	.1833	.0500	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	110,600
Elastic limit per square inch of original section	do...	71,000
Elongation per inch after rupture	inch..	.1933
Elongation per inch under strain at elastic limit	do...	.002467
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		1″. from neck
Character of broken surface		fine silky
Elongation of inch sections		″.28*, ″.18, ″.12

BUTT OF ROLLED BARREL, ANNEALED.

No. 5902.

Marks, 78 A.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000633	.000333	....	....	
6,000	30,000	.000967	.000334	....	....	
8,000	40,000	.001300	.000333	0.	....	
10,000	50,000	.001633	.000333	....	....	
10,200	51,000	.001667	.000034	....	....	
10,400	52,000	.001700	.000033	....	....	
10,600	53,000	.001733	.000033	....	....	Elastic limit. Load fell.
10,000	50,000	.002633	.000900	....	....	
10,200	51,000	.002967	.000334	....	....	
10,400	52,000	.004333	.001366	....	....	
10,600	53,000	.006433	.002100	....	....	
10,800	54,000	.008333	.001900	....	....	
11,000	55,000	.009333	.001000	....	....	
11,200	56,000	.010867	.001534	....	....	
11,400	57,000	.011300	.000433	....	....	
11,600	58,000	.011667	.000367	....	....	
11,800	59,000	.012400	.000733	....	....	
12,000	60,000	.013133	.000733	....	....	
12,400	62,000	.014333	.001200	....	....	
12,800	64,000	.016000	.001667	....	....	
13,200	66,000	.017667	.001667	....	....	
13,600	68,000	.019667	.002000	....	....	
14,000	70,000	.021400	.001733	....	....	
14,400	72,000	.023667	.002267	....	....	
14,800	74,000	.025500	.001833	....	....	
15,200	76,000	.027667	.002167	....	....	
15,600	78,000	.030000	.002333	....	....	
16,000	80,000	.032667	.002667	....	....	
16,800	84,000	.038333	.005666	....	....	
17,600	88,000	.045333	.007000	....	....	
18,400	92,000	.056667	.011334	....	....	
19,200	96,000	.070000	.013333	....	....	
20,000	100,000	.1067	.0367	....	....	
21,170	105,850	.1433	.0366	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	105,850
Elastic limit per square inch of original section ....do...	53,000
Elongation per inch after rupture ....inch..	.1867
Elongation per inch under strain at elastic limit ....do...	.001733
Reduction in diameter at point of rupture ....do...	.085
Reduction in area after rupture, per cent of original section	30.7
Position of rupture	at middle of stem
Character of broken surface	fine silky, trace of granulation
Elongation of inch sections	″.14, ″.29*, ″.13

BUTT OF BARREL, OIL-TEMPERED.

No. 5903.

Marks, 78 T.
Hollow specimen.
Exterior diameter, ″.588.
Diameter of bore, ″.300.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000633	.000333	....	....	
6,000	30,000	.001000	.000367	....	....	
7,000	35,000	.001167	.000167	....	....	
7,200	36,000	.001200	.000033	....	....	
7,400	37,000	.001267	.000067	....	....	
7,600	38,000	.001300	.000033	....	....	Elastic limit.
7,800	39,000	.001533	.000233	....	....	
8,000	40,000	.001633	.000100	.000333	.000333	
8,200	41,000	.001700	.000067	....	....	
8,400	42,000	.001767	.000067	....	....	
8,600	43,000	.001900	.000133	....	....	
8,800	44,000	.002033	.000133	....	....	
9,000	45,000	.002233	.000200	.000667	.000334	
9,200	46,000	.002367	.000134	....	....	
9,400	47,000	.002600	.000233	....	....	
9,600	48,000	.002933	.000333	....	....	
9,800	49,000	.003300	.000367	....	....	
10,000	50,000	.003633	.000333	.001800	.001133	
10,400	52,000	.004800	.001167	....	....	
10,800	54,000	.005500	.000700	....	....	
11,200	56,000	.006833	.001333	....	....	
11,600	58,000	.008333	.001500	....	....	
12,000	60,000	.009433	.001100	....	....	
12,400	62,000	.010733	.001300	....	....	
12,800	64,000	.012333	.001600	....	....	
13,200	66,000	.013500	.001167	....	....	
13,600	68,000	.015100	.001600	....	....	
14,000	70,000	.016667	.001567	....	....	
14,400	72,000	.018500	.001833	....	....	
14,800	74,000	.020333	.001833	....	....	
15,200	76,000	.022333	.002000	....	....	
15,600	78,000	.024500	.002167	....	....	
16,000	80,000	.026667	.002167	....	....	
16,800	84,000	.032333	.005666	....	....	
17,600	88,000	.037667	.005334	....	....	
18,400	92,000	.048333	.010666	....	....	
19,200	96,000	.055000	.006667	....	....	
20,000	100,000	.073000	.018000	....	....	
20,800	104,000	.1067	.0337	....	....	
20,960	104,800	.1300	.0233	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	**pounds..**	**104,800**
Elastic limit per square inch of original section	**do...**	**38,000**
Elongation per inch after rupture	**inch..**	**.1783**
Elongation per inch under strain at elastic limit	**do...**	**.001300**
Reduction in diameter at point of rupture (exterior)	**do...**	**.118**
Position of rupture		**″.8 from neck**
Character of broken surface		**silky, traces of granulation**
Elongation of inch sections		**″.29*, ″.12, ″.11**

BUTT OF BARREL, OIL TEMPERED.

No. 5904.

Marks, 78 T.
Hollow specimen.
Exterior diameter, ″.588.
Diameter of bore, ″.300.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000067	.000067	0.	....	
2,000	10,000	.000300	.000233	....	....	
4,000	20,000	.000633	.000333	....	....	
6,000	30,000	.000967	.000334	0.	....	
7,000	35,000	.001133	.000166	....	....	
7,200	36,000	.001200	.000067	....	....	
7,400	37,000	.001267	.000067	....	....	
7,600	38,000	.001300	.000033	....	....	
7,800	39,000	.001333	.000033	....	....	
8,000	40,000	.001367	.000034	.000067	.000067	Elastic limit indefinite.
8,200	41,000	.001467	.000100	....	....	
8,400	42,000	.001567	.000100	....	....	
8,600	43,000	.001667	.000100	....	....	
8,800	44,000	.001733	.000066	....	....	
9,000	45,000	.001800	.000067	.000333	.000266	
9,200	46,000	.001967	.000167	....	....	
9,400	47,000	.002067	.000100	....	....	
9,600	48,000	.002267	.000200	....	....	
9,800	49,000	.002433	.000166	....	....	
10,000	50,000	.002633	.000200	....	....	
10,200	51,000	.002867	.000234	....	....	
10,400	52,000	.003033	.000166	....	....	
10,600	53,000	.003200	.000167	....	....	
10,800	54,000	.003367	.000167	....	....	
11,000	55,000	.003700	.000333	.001700	.001367	
11,200	56,000	.004000	.000300	....	....	
11,400	57,000	.004267	.000267	....	....	
11,600	58,000	.004667	.000400	....	....	
11,800	59,000	.005367	.000700	....	....	
12,000	60,000	.005733	.000366	.003500	.001800	
12,400	62,000	.006533	.000800	....	....	
12,800	64,000	.007600	.001067	....	....	
13,200	66,000	.008767	.001167	....	....	
13,600	68,000	.009933	.001166	....	....	
14,000	70,000	.010833	.000900	....	....	
14,400	72,000	.012000	.001167	....	....	
14,800	74,000	.013200	.001200	....	....	
15,200	76,000	.014667	.001467	....	....	
15,600	78,000	.015667	.001000	....	....	
16,000	80,000	.017167	.001500	....	....	
16,800	84,000	.020500	.003333	....	....	
17,600	88,000	.023333	.002833	....	....	
18,400	92,000	.028000	.004667	....	....	
19,200	96,000	.032667	.004667	....	....	
20,000	100,000	.036667	.004000	....	....	
20,800	104,000	.043000	.006333	....	....	
21,600	108,000	.051333	.008333	....	....	
22,400	112,000	.066733	.015400	....	....	
23,200	116,000	.0900	.023267	....	....	
23,510	117,550	.1167	.0267	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	117,550
Elastic limit per square inch of original section	do	40,000
Elongation per inch after rupture	inch	.1400
Elongation per inch under strain at elastic limit	do	.001367
Reduction in diameter at point of rupture (exterior)	do	.068
Position of rupture		″.4 from neck
Character of broken surface		granular, 60 per cent; silky, 40 per cent
Elongation of inch sections		″.09, ″.11, ″.22*

BUTT OF FINISHED BARREL, WITHOUT OIL TEMPERING.

No. 5905.

Marks, 78 F.
Hollow specimen.
Exterior diameter, ''.588.
Diameter of bore, ''.300.
Sectional area, .20 square inch.
Gauged length, 3''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000633	.000333	....	....	
6,000	30,000	.001000	.000367	....	....	
7,000	35,000	.001167	.000167	....	....	
8,000	40,000	.001333	.000166	.000033	.000033	
10,000	50,000	.001700	.000367	.000033	0.	
11,000	55,000	.001900	.000200	....	....	
12,000	60,000	.002033	.000133	.000067	.000034	Elastic limit.
12,200	61,000	.002567	.000534	....	....	
						Load fell.
11,600	58,000	.003033	.000466	....	....	
11,800	59,000	.004000	.000967	....	....	
12,000	60,000	.011333	.007333	....	....	
12,200	61,000	.011733	.000400	....	....	
12,400	62,000	.012333	.000600	....	....	
12,600	63,000	.012933	.000600	....	....	
12,800	64,000	.013733	.000800	....	....	
13,200	66,000	.015767	.002034	....	....	
13,600	68,000	.016600	.000833	....	....	
14,000	70,000	.018333	.001700	....	....	
14,400	72,000	.020000	.001667	....	....	
14,800	74,000	.021667	.001667	....	....	
15,200	76,000	.023833	.002166	....	....	
15,600	78,000	.025500	.001667	....	....	
16,000	80,000	.027333	.001833	....	....	
16,800	84,000	.033333	.006000	....	....	
17,600	88,000	.038333	.005000	....	....	
18,400	92,000	.044667	.006334	....	....	
19,200	96,000	.053333	.008666	....	....	
20,000	100,000	.069000	.015667	....	....	
20,800	104,000	.1000	.0310	....	....	
20,900	104,500	.1300	.0300	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	104,500
Elastic limit per square inch of original section	do	60,000
Elongation per inch after rupture	inch	.1933
Elongation per inch under strain at elastic limit	do	.002033
Reduction in diameter at point of rupture (exterior)	do	.118
Position of rupture		1''.5 from neck
Character of broken surface		fine silky
Elongation of inch sections		''.15, ''.30*, ''.13

BUTT OF FINISHED BARREL, WITHOUT OIL TEMPERING.

No. 5906.

Marks, 78 F.
Hollow specimen.
Exterior diameter, ″.588.
Diameter of bore, ″.300.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000067	.000067	0.	....	
2, 000	10, 000	.000267	.000200	....	....	
4, 000	20, 000	.000600	.000333	....	....	
6, 000	30, 000	.000933	.000333	....	....	
8, 000	40, 000	.001267	.000334	....	....	
10, 000	50, 000	.001633	.000366	0.	....	
11, 000	55, 000	.001800	.000167	....	....	
12, 000	60, 000	{ .002000 .004433	.000200 .002433	.000033	.000033	Elastic limit.
12, 200	61, 000	.006667	.002234	....	....	
12, 400	62, 000	.007333	.000666	....	....	
12, 600	63, 000	.007833	.000500	....	....	
12, 800	64, 000	.008633	.000800	....	....	
13, 000	65, 000	.009367	.000734	....	....	
13, 200	66, 000	.009700	.000333	....	....	
13, 600	68, 000	.011000	.001300	....	....	
14, 000	70, 000	.011900	.000900	....	....	
14, 400	72, 000	.013067	.001167	....	....	
14, 800	74, 000	.014333	.001266	....	....	
15, 200	76, 000	.016200	.001867	....	....	
15, 600	78, 000	.016900	.000700	....	....	
16, 000	80, 000	.018100	.001200	....	....	
16, 800	84, 000	.021167	.003067	....	....	
17, 600	88, 000	.024333	.003166	....	....	
18, 400	92, 000	.027833	.003500	....	....	
19, 200	96. 000	.031667	.003834	....	....	
20, 000	100, 000	.036033	.004366	....	....	
20, 800	104, 000	.041333	.005300	....	....	
21, 600	108, 000	.049333	.008000	....	....	
22, 400	112, 000	.058667	.009334	....	....	
23, 200	116. 000	.077667	.019000	....	....	
23, 610	118, 050	.1167	.039033	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section....................pounds..	118, 050
Elastic limit per square inch of original section....................do...	60, 000
Elongation per inch after rupture....................inch..	.1600
Elongation per inch under strain at elastic limit....................do...	.002000
Reduction in diameter at point of rupture (exterior)....................do...	.078
Position of rupture....................	1″.6 from neck
Character of broken surface....................	fine granular
Elongation of inch sections....................	″.12, ″.24*, ″.12

REGULAR ROLLED BARREL, ANNEALED IN CHARCOAL.

No. 5926.

Marks, 78.
Diameter, ''.505.
Sectional area, .20 square inch.
Gauged length, 3''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 090	5, 000	.000100	.000100	0.	....	
2, 000	10, 000	.000300	.000200	....	....	
4, 000	20, 000	.000633	.000333	....	....	
6, 000	30, 000	.000967	.000334	....	....	
8, 000	40, 090	.001333	.000366	0.	....	
10, 000	50, 000	.001667	.000334	....	....	
12, 000	60, 000	.002000	.000333	.000033	.000033	
12, 800	64, 000	.002200	.000200	....	....	
13, 000	65, 000	.002267	.000067	....	....	Elastic limit.
13, 200	66, 000	.011167	.008900	....	....	
13, 400	67, 000	.011833	.000666	....	....	
13, 600	68, 000	.012667	.000834	....	....	
13, 800	69, 000	.013333	.000666	....	....	
14, 000	70, 000	.014167	.000834	....	....	
14, 400	72, 000	.015667	.001500	....	....	
14, 800	74, 000	.017167	.001500	....	....	
15, 200	76, 000	.019000	.001833	....	....	
15, 600	78, 000	.020833	.001833	....	....	
16, 000	80, 000	.022733	.001900	....	....	
16, 800	84, 000	.027000	.004267	....	....	
17, 600	88, 000	.031667	.004667	....	....	
18, 400	92, 000	.036667	.005000	....	....	
19, 200	96, 000	.043667	.007000	....	....	
20, 000	100, 000	.053333	.009666	....	....	
20, 800	104, 000	.066000	.012667	....	....	
21, 600	108, 000	.101667	.035667	....	....	
21, 710	108, 550	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	108, 550
Elastic limit per square inch of original section	do...	65, 000
Elongation per inch after rupture	inch..	.2033
Elongation per inch under strain at elastic limit	do...	.002267
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46. 2
Position of rupture		1''.54 from neck
Character of broken surface		fine silky
Elongation of inch sections		''.14, ''.35*, ''.12

REGULAR ROLLED BARREL, ANNEALED IN CHARCOAL.

No. 5927.

Marks, 78.
Diameter, ''.505.
Sectional area, .20 square inch.
Gauged length, 3''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	....	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000633	.000333	....	....	
6,000	30,000	.001000	.000367	....	....	
8,000	40,000	.001333	.000333	.000033	.000033	
10,000	50,000	.001667	.000334	....	....	
12,000	60,000	.002000	.000333	.000033	0.	
12,800	64,000	.002167	.000167	....	....	Elastic limit.
13,000	65,000	.021400	.019233	....	....	
13,200	66,000	.022667	.001267	....	....	
13,400	67,000	.023567	.000900	....	....	
13,600	68,000	.024667	.001100	....	....	
13,800	69,000	.026167	.001500	....	....	
14,000	70,000	.027000	.000833	....	....	
14,400	72,000	.029167	.002167	....	....	
14,800	74,000	.032167	.003000	....	....	
15,200	76,000	.035000	.002833	....	....	
15,600	78,000	.037833	.002833	....	....	
16,000	80,000	.044667	.006834	....	....	
16,800	84,000	.051000	.006333	....	....	
17,600	88,000	.064667	.013667	....	....	
18,400	92,000	.083333	.018666	....	....	
19,200	96,000	.126667	.043334	....	....	
19,240	96,200	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	96,200
Elastic limit per square inch of original section	do	64,000
Elongation per inch after rupture	inch	.2400
Elongation per inch under strain at elastic limit	do	.002167
Reduction in diameter at point of rupture	do	.155
Reduction in area after rupture, per cent of original section		51.9
Position of rupture		1''.25 from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		''.14, ''.33*, ''.25*

REGULAR ROLLED BARREL, COOLED IN AIR.

No. 5928.

Marks, 78 A.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000633	.000333	....	....	
6,000	30,000	.000967	.000334	....	....	
8,000	40,000	.001333	.000366	0.	....	
10,000	50,000	.001667	.000334	0.	....	
12,000	60,000	.002000	.000333	....	....	
13,000	65,000	.002167	.000167	....	....	
13,200	66,000	.002233	.000066	....	....	Elastic limit.
13,400	67,000	.002567	.000334	....	....	
13,600	68,000	.008100	.005533	....	....	
13,800	69,000	.008733	.000633	....	....	
14,000	70,000	.009333	.000600	....	....	
14,400	72,000	.010500	.001167	....	....	
14,800	74,000	.011667	.001167	....	....	
15,200	76,000	.013400	.001733	....	....	
15,600	78,000	.014767	.001367	....	....	
16,000	80,000	.016633	.001866	....	....	
16,800	84,000	.018333	.001700	....	....	
17,600	88,000	.023333	.005000	....	....	
18,400	92,000	.027500	.004167	....	....	
19,200	96,000	.032067	.004567	....	....	
20,000	100,000	.036667	.004600	....	....	
20,800	104,000	.043000	.006333	....	....	
21,600	108,000	.051667	.008667	....	....	
22,400	112,000	.064333	.012666	....	....	
23,200	116,000	.1133	.048967	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	116,000
Elastic limit per square inch of original section	do...	66,000
Elongation per inch after rupture	inch..	.1633
Elongation per inch under strain at elastic limit	do...	.002233
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section	do...	40.3
Position of rupture		1″.55 from neck
Character of broken surface		silky, trace of granulation
Elongation of inch sections		″.10, ″.28*, ″.11

REGULAR ROLLED BARREL, ANNEALED IN CHARCOAL.

No. 5927.

Marks, 78.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	....	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000633	.000333	....	....	
6,000	30,000	.001000	.000367	....	....	
8,000	40,000	.001333	.000333	.000033	.000033	
10,000	50,000	.001667	.000334	....	....	
12,000	60,000	.002000	.000333	.000033	0.	
12,800	64,000	.002167	.000167	....	....	Elastic limit.
13,000	65,000	.021400	.019233	....	....	
13,200	66,000	.022667	.001267	....	....	
13,400	67,000	.023567	.000900	....	....	
13,600	68,000	.024667	.001100	....	....	
13,800	69,000	.026167	.001500	....	....	
14,000	70,000	.027000	.000833	....	....	
14,400	72,000	.029167	.002167	....	....	
14,800	74,000	.032167	.003000	....	....	
15,200	76,000	.035000	.002833	....	....	
15,600	78,000	.037833	.002833	....	....	
16,000	80,000	.044667	.006834	....	....	
16,800	84,000	.051000	.006333	....	....	
17,600	88,000	.064667	.013667	....	....	
18,400	92,000	.083333	.018666	....	....	
19,200	96,000	.126667	.043334	....	....	
19,240	96,200	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	96,200
Elastic limit per square inch of original section	do...	64,000
Elongation per inch after rupture	inch..	.2400
Elongation per inch under strain at elastic limit	do...	.002167
Reduction in diameter at point of rupture	do...	.155
Reduction in area after rupture, per cent of original section		51.9
Position of rupture		1″.25 from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		″.14, ″.33*, ″.25*

REGULAR ROLLED BARREL, COOLED IN AIR.

No. 5928.

Marks, 78 A.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000633	.000333	....	....	
6,000	30,000	.000967	.000334	....	....	
8,000	40,000	.001333	.000366	0.	....	
10,000	50,000	.001667	.000334	0.	....	
12,000	60,000	.002000	.000333	....	....	
13,000	65,000	.002167	.000167	....	....	
13,200	66,000	.002233	.000066	....	....	Elastic limit.
13,400	67,000	.002567	.000334	....	....	
13,600	68,000	.008100	.005533	....	....	
13,800	69,000	.008733	.000633	....	....	
14,000	70,000	.009333	.000600	....	....	
14,400	72,000	.010500	.001167	....	....	
14,800	74,000	.011667	.001167	....	....	
15,200	76,000	.013400	.001733	....	....	
15,600	78,000	.014767	.001367	....	....	
16,000	80,000	.016633	.001866	....	....	
16,800	84,000	.018333	.001700	....	....	
17,600	88,000	.023333	.005000	....	....	
18,400	92,000	.027500	.004167	....	....	
19,200	96,000	.032067	.004567	....	....	
20,000	100,000	.036667	.004600	....	....	
20,800	104,000	.043000	.006333	....	....	
21,600	108,000	.051667	.008667	....	....	
22,400	112,000	.064333	.012666	....	....	
23,200	116,000	.1133	.048967	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	116,000
Elastic limit per square inch of original section	do...	66,000
Elongation per inch after rupture	inch..	.1633
Elongation per inch under strain at elastic limit	do...	.002233
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section	do...	40.3
Position of rupture		1″.55 from neck
Character of broken surface		silky, trace of granulation
Elongation of inch sections		″.10, ″.28*, ″.11

REGULAR ROLLED BARREL, COOLED IN AIR.

No. 5929.

Marks, 78 A.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.		
2,000	10,000	.000333	.000233			
4,000	20,000	.000667	.000334			
6,000	30,000	.001000	.000333			
8,000	40,000	.001367	.000367	0.		
10,000	50,000	.001733	.000366			
12,000	60,000	.002100	.000367	.000033	.000033	
12,400	62,000	.002133	.000033			
12,600	63,000	.002233	.000100			
12,800	64,000	.002300	.000067			Elastic limit.
13,000	65,000	.008000	.005700			
13,200	66,000	.008367	.000367			
13,400	67,000	.008900	.000533			
13,600	68,000	.009600	.000700			
13,800	69,000	.010100	.000500			
14,000	70,000	.010800	.000700			
14,400	72,000	.012000	.001200			
14,800	74,000	.013600	.001600			
15,200	76,000	.015233	.001633			
15,600	78,000	.016867	.001634			
16,000	80,000	.018333	.001466			
16,800	84,000	.022333	.004000			
17,600	88,000	.025833	.003500			
18,400	92,000	.029833	.004000			
19,200	96,000	.034667	.004834			
20,000	100,000	.040000	.005333			
20,800	104,000	.047667	.007667			
21,600	108,000	.058333	.010666			
22,400	112,000	.0767	.018367			
22,780	113,900	.1100	.0333			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	113,900
Elastic limit per square inch of original section	do...	64,000
Elongation per inch after rupture	inch..	.1633
Elongation per inch under strain at elastic limit	do...	.002300
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		87.1
Position of rupture		1″.3 from neck
Character of broken surface		silky, interspersed with granular metal
Elongation of inch sections		″.09, ″.24*, ″.16

BARREL COOLED IN AIR, WITHOUT OIL TEMPERING.

No. 5930.

Marks, 78 A F.
Hollow specimen.
Exterior diameter, ″.588.
Diameter of bore, ″.300.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	000633	.000333	....	....	
6,000	30,000	.000967	.000334	....	....	
8,000	40,000	.001333	.000366	....	....	
10,000	50,000	.001667	.000334	....	....	
12,000	60,000	.002033	.000366	....	....	
12,200	61,000	.002067	000034	0.	....	
12,400	62,000	.002100	.000033	....	....	Elastic limit.
12,600	63,000	.003633	.001533	0.	....	
12,800	64,000	.006500	.002867	....	....	
13,000	65,000	.007600	.001100	....	....	
13,200	66,000	.008433	.000833	....	....	
13,400	67,000	.008900	.000467	....	....	
13,600	68,000	.009333	.000433	....	....	
13,800	69,000	.010067	.000734	....	....	
14,000	70,000	.010933	.000866	....	....	
14,400	72,000	.012133	.001200	....	....	
14,800	74,000	.013400	.001267	....	....	
15,200	76,000	.016167	.002767	....	....	
15,600	78,000	.017833	.001666	....	....	
16,000	80,000	.018500	.000667	....	....	
16,800	84,000	.022000	.003500	....	....	
17,600	88,000	.025667	.003667	....	....	
18,400	92,000	.029667	.004000	....	....	
19,200	96,000	.035667	.006000	....	....	
20,000	100,000	.040833	.005166	....	....	
20,800	104,000	.048000	.007167	....	....	
21,600	108,000	.059833	.011833	....	....	
22,400	112,000	.0833	.023167	....	....	
22,860	114,300	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	114,300
Elastic limit per square inch of original section	do...	62,000
Elongation per inch after rupture	inch..	.1633
Elongation per inch under strain at elastic limit	do...	.002100
Reduction in diameter at point of rupture (exterior)	do ..	.1080
Position of rupture		″.95 from neck
Character of broken surface		silky, trace of granulation
Elongation of inch sections		″.26*, ″.14, ″.09

Barrel Cooled in Air, without Oil Tempering.

No. 5931.

Marks, 78 A F.
Hollow specimen.
Exterior diameter, ″.588.
Diameter of bore, ″.300.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000100	.000100	0.	....	
2, 000	10, 000	.000333	.000233	....	....	
4, 000	20, 000	.000667	.000334	....	....	
6, 000	30, 000	.001000	.000333	....	....	
8, 000	40, 000	.001367	.000367	0.	....	
10, 000	50, 000	.001733	.000366	....	....	
12, 000	60, 000	.002067	.000334	0.	....	
12, 200	61, 000	.002100	.000033	....	....	
12, 400	62, 000	.002133	.000033	....	....	
12, 600	63, 000	.002167	.000034	....	....	
12, 800	64, 000	.002233	.000066	....	....	
13, 000	65. 000	.002267	.000034	....	....	
13, 200	66, 000	.002333	.000066	....	....	
13, 400	67, 000	.002367	.000034	....	....	
13, 600	68, 000	.002400	.000033	....	....	
13, 800	69, 000	.002433	.000033	....	....	Elastic limit.
14, 000	70, 000	.008233	.005800	....	....	
14. 200	71, 000	.008967	.000734	....	....	
14, 400	72, 000	.009333	.000366	....	....	
14. 800	74, 000	.010733	.001400	....	....	
15, 200	76, 000	.011700	.000967	....	....	
15, 600	78, 000	.013267	.001567	....	....	
16, 000	80, 000	.014667	.001400	....	....	
16, 800	84, 000	.017333	.002666	....	....	
17, 600	88, 000	.020000	.002667	....	....	
18. 400	92, 000	.024067	.004067	....	....	
19, 200	96, 000	.028033	.003966	....	....	
20, 000	100, 000	.032400	.004367	....	....	
20, 800	104, 000	.036667	.004267	....	....	
21, 600	108, 000	.043267	.006600	....	....	
22, 400	112. 000	.051000	.007733	....	....	
23, 200	116, 000	.064333	.013333	....	....	
24, 000	120, 000	.0933	.028967	....	....	
24, 110	120, 550	.1133	.0200	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	120, 550
Elastic limit per square inch of original section	do...	69, 000
Elongation per inch after rupture	inch..	.1567
Elongation per inch under strain at elastic limit	do...	.002483
Reduction in diameter at point of rupture (exterior)	do...	.1080
Position of rupture		1″ from neck
Character of broken surface		silky, trace of granulation
Elongation of inch sections		″.24*, ″.15, ″.08

BARREL, OIL TEMPERED, AND THEN COOLED IN AIR.

No. 5932.

Marks, 78 A T.
Hollow specimen.
Exterior diameter, ″.588.
Diameter of bore, ″.300.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	0.	
2,000	10,000	.000333	.000233	....	....	
4,000	20,000	.000667	.000334	....	....	
6,000	30,000	.001000	.000333	....	....	
8,000	40,000	.001367	.000367	0.	....	
10,000	50,000	.001700	.000333	0.	....	
11,800	59,000	.002100	.000400	....	....	
12,000	60,000	.002200	.000100	0.	....	
12,200	61,000	.002267	.000067	....	....	Elastic limit.
12,400	62,000	.002667	.000400	....	....	
12,600	63,000	.003567	.000900	....	....	
12,800	64,000	.003933	.000366	....	....	
13,000	65,000	.005667	.001734	....	....	
13,200	66,000	.006933	.001266	....	....	
13,400	67,000	.007567	.000634	....	....	
13,600	68,000	.008200	.000633	....	....	
13,800	69,000	.008933	.000733	....	....	
14,000	70,000	.009667	.000734	....	....	
14,400	72,000	.011033	.001366	....	....	
14,800	74,000	.012667	.001634	....	....	
15,200	76,000	.014000	.001333	....	....	
15,600	78,000	.015333	.001333	....	....	
16,000	80,000	.016833	.001500	....	....	
16,800	84,000	.020333	.003500	....	....	
17,600	88,000	.023667	.003334	....	....	
18,400	92,000	.027333	.003666	....	....	
19,200	96,000	.032667	.005334	....	....	
20,000	100,000	.036333	.003666	....	....	
20,800	104,000	.042500	.006167	....	....	
21,600	108,000	.050667	.008167	....	....	
22,400	112,000	.063333	.012666	....	....	
23,200	116,000	.0933	.029967	....	....	
23,300	116,500	.1100	.0167	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section....pounds..	116,500
Elastic limit per square inch of original section....do...	61,000
Elongation per inch after rupture....inch..	.1567
Elongation per inch under strain at elastic limit....do...	.002267
Reduction in diameter at point of rupture (exterior)....do...	.1180
Position of rupture....	1″.18 from neck
Character of broken surface....	silky
Elongation of inch sections....	″.21*, ″.17, ″.09

BARREL OIL TEMPERED, AND THEN COOLED IN AIR.

No. 5933.

Marks, 78 A T.
Hollow specimen.
Exterior diameter, ″.588.
Diameter of bore, ″.300.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000633	.000333	....	....	
6,000	30,000	.000967	.000334	....	....	
8,000	40,000	.001333	.000366	.000033	.000033	
9,600	48,000	.001633	.000300	....	....	
9,800	49,000	.001700	.000067	....	....	Elastic limit.
10,000	50,000	.001967	.000267	.000167	.000134	
10,200	51,000	.002033	.000066	....	....	
10,400	52,000	.002100	.000067	....	....	
10,600	53,000	.002167	.000067	....	....	
10,800	54,000	.002300	.000133	....	....	
11,000	55,000	.002400	.000100	....	....	
11,200	56,000	.002600	.000200	....	....	
11,400	57,000	.002700	.000100	....	....	
11,600	58,000	.002967	.000267	....	....	
11,800	59,000	.003300	.000333	....	....	
12,000	60,000	.003700	.000400	....	....	
12,400	62,000	.005167	.001467	....	....	
12,800	64,000	.006267	.001100	....	....	
13,200	66,000	.006933	.000666	....	....	
13,600	68,000	.007600	.000667	....	....	
14,000	70,000	.008633	.001033	....	....	
14,400	72,000	.009833	.001200	....	....	
14,800	74,000	.010767	.000934	....	....	
15,200	76,000	.012333	.001566	....	....	
15,600	78,000	.013100	.000767	....	....	
16,000	80,000	.014667	.001567	....	....	
16,800	84,000	.017833	.003166	....	....	
17,600	88,000	.021333	.003500	....	....	
18,400	92,000	.025000	.003667	....	....	
19,200	96,000	.030000	.005000	....	....	
20,000	100,000	.036333	.006333	....	....	
20,800	104,000	.045333	.009000	....	....	
21,600	108,000	.060000	.014667	....	....	
21,920	109,600	.0933	.0333	....	....	Tensile strength.

General summary.

Tensile strength, per square inch of original section	pounds	109,600
Elastic limit, per square inch of original section	do	49,000
Elongation per inch after rupture	inch	.1167
Elongation per inch under strain at elastic limit	do	.001700
Reduction in diameter at point of rupture (exterior)	do	.1180
Position of rupture		″.55 from neck
Character of broken surface		silky
Elongation of inch sections		″.02, ″.05, ″.28*

BARRELS SLIGHTLY HEATED AT BUTT TO REMOVE HARD SPOT NEAR BOTTOM OF CHAMBER, CAUSED BY PROVING.

No. 5934.

Marks, X A.
Hollow specimen.
Exterior diameter, ″.588.
Diameter of bore, ″.300.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	....	
2,000	10,000	.000333	.000200	....	....	
4,000	20,000	.000667	.000334	....	....	
6,000	30,000	.001000	.000333	....	....	
8,000	40,000	.001333	.000333	0.	....	
10,000	50,000	.001667	.000334	0.	....	
11,200	56,000	.001967	.000300	....	....	
11,400	57,000	.002000	.000033	....	....	Elastic limit.
11,600	58,000	.002667	.000667	....	....	
11,800	59,000	.011833	.009166	....	....	
12,000	60,000	.012833	.001000	....	....	
12,400	62,000	.014100	.001267	....	....	
12,800	64,000	.015300	.001200	....	....	
13,200	66,000	.017000	.001700	....	....	
13,600	68,000	.018067	.001067	....	....	
14,000	70,000	.019667	.001600	....	....	
14,400	72,000	.021333	.001666	....	....	
14,800	74,000	.023167	.001834	....	....	
15,200	76,000	.026000	.002833	....	....	
15,600	78,000	.027100	.001100	....	....	
16,000	80,000	.029338	.002233	....	....	
16,800	84,000	.034500	.005167	....	....	
17,600	88,000	.041167	.006667	....	....	
18,400	92,000	.049333	.008166	....	....	
19,200	96,000	.058333	.009000	....	....	
20,000	100,000	.075667	.017334	....	....	
20,800	104,000	.1200	.044333	....	....	
20,820	104,100	.1367	.0167	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	104,100
Elastic limit per square inch of original section ....do...	57,000
Elongation per inch after rupture ....inch..	.2000
Elongation per inch under strain at elastic limit ....do...	.002000
Reduction in diameter at point of rupture (exterior) ....do...	.1280
Position of rupture	″.85 from neck
Character of broken surface	fine silky
Elongation of inch sections	″.31*, ″.17, ″.12

No. 5935.

Marks, X A.
Hollow specimen.
Exterior diameter, ″.588.
Diameter of bore, ″.300.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	....	
2,000	10,000	.000300	.000167	....	....	
4,000	20,000	.000600	.000300	....	....	
6,000	30,000	.000933	.000333	....	....	
8,000	40,000	.001300	.000367	0.	....	
10,000	50,000	.001633	.000333	....	....	
12,000	60,000	.001933	.000300	....	....	
13,000	65,000	.002133	.000200	....	....	
13,800	69,000	.002267	.000134	....	....	Elastic limit.
14,000	70,000	.016433	.014166	....	....	
14,200	71,000	.016900	.000467	....	....	
14,400	72,000	.017833	.000933	....	....	
14,800	74,000	.019533	.001700	....	....	
15,200	76,000	.020667	.001134	....	....	
15,600	78,000	.023167	.002500	....	....	
16,000	80,000	.025200	.002033	....	....	
16,800	84,000	.030000	.004800	....	....	
17,600	88,000	.035333	.005333	....	....	
18,400	92,000	.041667	.006334	....	....	
19,200	96,000	.050367	.008700	....	....	
20,000	100,000	.061333	.010966	....	....	
20,800	104,000	.0833	.021967	....	....	
21,260	106,300	.1200	.0367	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	106,300
Elastic limit per square inch of original section	do...	69,000
Elongation per inch after rupture	inch..	.1733
Elongation per inch under strain at elastic limit	do...	.002267
Reduction in diameter at point of rupture (exterior)	do...	.1480
Position of rupture		″.65 from neck
Character of broken surface		fine silky
Elongation of inch sections		″.08, ″.10, ″.34

No. 5942.

Marks, 79 S.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000667	.000367	....	....	
6,000	30,000	.001000	.000333	....	....	
8,000	40,000	.001333	.000333	....	....	
10.000	50,000	.001667	.000334	0.	....	
12,000	60,000	.002067	.000400	0.	....	
13,000	65,000	.002267	.000200	....	....	
14.000	70,000	.002400	.000133	....	....	
14,200	71,000	.002467	.000067	....	....	Elastic limit.
14,400	72,000	.002667	.000200	....	....	
						Load fell.
13,000	65,000	.003333	.000666	....	....	
13,200	66,000	.003533	.000200	....	....	
13,400	67,000	.004167	.000634	....	....	
13,600	68,000	.007667	.003500	....	....	
13.800	69,000	.010833	.003166	....	....	
14,000	70,000	.011500	.000667	....	....	
14,200	71,000	.011967	.000467	....	....	
14,400	72,000	.012933	.000966	....	....	
14.800	74,000	.014000	.001067	....	....	
15,200	76,000	.015333	.001333	....	....	
15,600	78,000	.017167	.001834	....	....	
16,000	80,000	.018500	.001333	....	....	
16,800	84,000	.022500	.004000	....	....	
17,600	88,000	.026333	.003833	....	....	
18,400	92,000	.031000	.004667	....	....	
19,200	96,000	.036000	.005000	....	....	
20,000	100,000	.041833	.005833	....	....	
20,800	104,000	.049000	.007167	....	....	
21,600	108,000	.058333	.009333	....	....	
22,400	112,000	.0767	.018367	....	....	
23,060	115,300	.1200	.0433	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	115,300
Elastic limit per square inch of original section	do...	71,000
Elongation per inch after rupture	inch..	.1867
Elongation per inch under strain at elastic limit	do...	.002467
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		40.3
Position of rupture		1″.4 from neck
Character of broken surface		fine silky
Elongation of inch sections		″.12, ″.31*, ″.13

REGULAR STOCK ROLLED AT A LOW HEAT AND PACKED IN CHARCOAL TO ANNEAL.

No. 5947.

Marks, 78.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	....	
2,000	10,000	.000333	.000200	....	....	
4,000	20,000	.000667	.000334	....	....	
6,000	30,000	.001000	.000333	....	....	
8,000	40,000	.001367	.000367	0.	....	
10,000	50,000	.001700	.000333	....	....	
12,000	60,000	.002033	.000333	....	....	
13,600	68,000	.002333	.000300	....	....	Elastic limit. Load fell.
12,600	63,000	.003233	.000900	....	....	
12,800	64,000	.003367	.000134	....	....	
13,000	65,000	.003800	.000433	....	....	
13,200	66,000	.004933	.001133	....	....	
13,400	67,000	.016600	.011667	....	....	
13,600	68,000	.017367	.000767	....	....	
13,800	69,000	.018033	.001266	....	....	
14,000	70,000	.019733	.001100	....	....	
14,400	72,000	.020700	.000967	....	....	
14,800	74,000	.022833	.002133	....	....	
15,200	76,000	.025100	.002267	....	....	
15,600	78,000	.027500	.002400	....	....	
16,000	80,000	.029667	.002167	....	....	
16,800	84,000	.036433	.006766	....	....	
17,600	88,000	.043500	.007067	....	....	
18,400	92,000	.053000	.009500	....	....	
19,200	96,000	.065667	.012667	....	....	
20,000	100,000	.0933	.027633	....	....	
20,420	102,100	.1300	.0367	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	102,100
Elastic limit per square inch of original section	do...	68,000
Elongation per inch after rupture	inch..	.2133
Elongation per inch under strain at elastic limit	do...	.002333
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		1″.28 from neck
Character of broken surface		fine silky; cup shaped
Elongation of inch sections		″.28*, ″.24*, ″.12

No. 5948.

Marks, 78.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3.″

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	....	
2,000	10,000	.000300	.000167	....	....	
4,000	20,000	.000633	.000333	....	....	
6,000	30,000	.000967	.000334	....	....	
8,000	40,000	.001300	.000333	0.	....	
10,000	50,000	.001667	.000367	....	....	
12,000	60,000	.002033	.000366	0.	....	
14,000	70,000	.002367	.000334	0.	....	
14,200	71,000	.002400	.000033	....	....	
14,200	72,000	.002433	.000033	....	....	
14,600	73,000	.002467	.000034	....	....	
14,800	74,000	.002533	.000066	....	....	
15,000	75,000	.002600	.000067	....	....	Elastic limit. Load fell.
14,000	70,000	.003333	.000738	....	....	
14,200	71,000	.004300	.000967	....	....	
14,400	72,000	.008667	.004367	....	....	
14,600	73,000	.012333	.003666	....	....	
14,800	74,000	.014767	.002484	....	....	
15,000	75,000	.015367	.000600	....	....	
15,200	76,000	.016333	.000966	....	....	
15,600	78,000	.017867	.001534	....	....	
16,000	80,000	.019667	.001800	....	....	
16,800	84,000	.023933	.004266	....	....	
17,600	88,000	.028433	.004500	....	....	
18,400	92,000	.032833	.004400	....	....	
19,200	96,000	.039667	.006834	....	....	
20,000	100,000	.047000	.007333	....	....	
20,800	104,000	.0600	.0130	....	....	
21,600	108,000	.0767	.0167	....	....	
22,340	111,700	.1267	.0500	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	111,700
Elastic limit per square inch of original section	do...	75,000
Elongation per inch after rupture	inch..	.1900
Elongation per inch under strain at elastic limit	do...	.002600
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		49.1
Position of rupture		1″ from neck
Character of broken surface		fine silky; cup shaped
Elongation of inch sections		″.09, ″.15, ″.33*

FROM REGULAR STOCK ROLLED AT A LOW HEAT, FINISHED AT A LOW HEAT, AND COOLED IN THE AIR.

No. 5949.

Marks, 78 . .
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	....	
2,000	*10,000	.000300	.000167	....	....	
4,000	20,000	.000633	.000333	....	....	
6,000	30,000	.001000	.000367	....	....	
8,000	40,000	.001367	.000367	0.	....	
10,000	50,000	.001700	.000333	....	....	
12,000	60,000	.002067	.000367	....	....	
13,000	65,000	.002267	.000200	....	....	
13,800	69,000	.002433	.000166	....	....	Elastic limit.
14,000	70,000	.003133	.000700	....	....	
						Load fell.
13,000	65,000	.003267	.000134	....	....	
13,200	66,000	.004300	.001033	....	....	
13,400	67,000	.014933	.010633	....	....	
13,600	68,000	.016000	.001167	....	....	
13,800	69,000	.016333	.000333	....	....	
14,000	70,000	.017100	.000767	....	....	
14,400	72,000	.019033	.001933	....	....	
14,800	74,000	.021000	.001967	....	....	
15,200	76,000	.023333	.002333	....	....	
15,600	78,000	.025333	.002000	....	....	
16,000	80,000	.027833	.002500	....	....	
16,800	84,000	.034500	.006667	....	....	
17,600	88,000	.041000	.006500	....	....	
18,400	92,000	.049000	.008000	....	....	
19,200	96,000	.063000	.014000	....	....	
20,000	100,000	.0833	.0203	....	....	
20,590	102,950	.1400	.0567	....	....	Tensile strength.

General summary.

Tensile strength, per square inch of original section	pounds..	102,950
Elastic limit, per square inch of original section	do...	69,000
Elongation per inch after rupture	inch..	.1967
Elongation per inch under strain at elastic limit	do...	.002433
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		1″.24 from neck
Character of broken surface		fine silky
Elongation of inch sections		″.24*, ″.26*, ″.09

No. 5950.

Marks, 78 . .
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000100	.000100	0.	....	
2, 000	10, 000	.000333	.000233	....	....	
4, 000	20, 000	.000667	.000334	....	....	
6, 000	30, 000	.001000	.000333	....	....	
8, 000	40, 000	.001367	.000367	....	....	
10, 000	50, 000	.001700	.000333	....	....	
12, 000	60, 000	.002033	.000333	0.	....	
14, 000	70, 000	.002367	.000334	....	....	
15, 000	75, 000	.002533	.000166	....	....	
15, 200	76, 000	.002567	.000034	....	....	Elastic limit.
15, 400	77, 000	.003000	.000433	....	....	
						Load fell.
14, 400	72, 000	.003333	.000333	....	....	
14, 600	73, 000	.003633	.000300	....	....	
14, 800	74, 000	.004267	.000634	....	....	
15, 000	75, 000	.005833	.001566	....	....	
15, 200	76, 000	.006933	.001100	....	....	
15, 400	77, 000	.007833	.000900	....	....	
15, 600	78, 000	.008567	.000734	....	....	
16, 000	80, 000	.011333	.002766	....	....	
16, 800	84, 000	.017167	.005834	....	....	
17, 600	88, 000	.020667	.003500	....	....	
18, 400	92, 000	.025100	.004433	....	....	
19, 200	96, 000	.030333	.005233	....	....	
20, 000	100, 000	.035400	.005067	....	....	
20, 800	104, 000	.043333	.007933	....	....	
21, 600	108, 000	.053000	.009667	....	....	
22, 400	112, 000	.068333	.015333	....	....	
23, 140	115, 700	.1267	.058367	....	....	Tensile strength.

General summary.

Tensile strength, per square inch of original section	pounds..	115, 700
Elastic limit, per square inch of original section	do...	76, 000
Elongation per inch after rupture	inch..	.1700
Elongation per inch under strain at elastic limit	do...	.002567
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		49. 1
Position of rupture		″.8 from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		″.07, ″.11, ″.83*

No. 5971.

Marks, 50 T.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.		
2,000	10,000	.000300	.000167			
4,000	20,000	.000667	.000367			
6,000	30,000	.001000	.000333			
8,000	40,000	.001367	.000367			
10,000	50,000	.001700	.000333	0.		
12,000	60,000	.002033	.000333			
13,000	65,000	.002267	.000234			
14,000	70,000	.002433	.000166	0.		
14,600	73,000	.002533	.000100			Elastic limit.
14,800	74,000	.003267	.000734			
						Load fell.
13,800	69,000	.005333	.002066			
14,000	70,000	.010400	.005067			
14,200	71,000	.010933	.000533			
14,400	72,000	.011333	.000400			
14,600	73,000	.011967	.000634			
14,800	74,000	.012667	.000700			
15,200	76,000	.014500	.001833			
15,600	78,000	.015233	.000733			
16,000	80,000	.017333	.002100			
16,800	84,000	.020200	.002867			
17,600	88,000	.023733	.003533			
18,400	92,000	.027667	.003934			
19,200	96,000	.032700	.005033			
20,000	100,000	.037667	.004967			
20,800	104,000	.0467	.009033			
21,600	108,000	.0533	.0066			
22,400	112,000	.0667	.0134			
23,200	116,000	.0933	.0266			
23,340	116,700					Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	116,700
Elastic limit per square inch of original section	do...	73,000
Elongation per inch after rupture	inch..	.1867
Elongation per inch under strain at elastic limit	do...	.002533
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		at middle of stem
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		″.12, ″.32*, ″.12

No. 5972.

Marks, 50 T A.
Diameter, ''.505.
Sectional area, .20 square inch.
Gauged length, 3''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000667	.000367	....	....	
6,000	30,000	.001000	.000333	....	....	
8,000	40,000	.001333	.000333	....	....	
10,000	50,000	.001700	.000367	0.	....	
12,000	60,000	.002033	.000333	....	....	
13,000	65,000	.002200	.000167	....	....	
14,000	70,000	.002367	.000167	....	....	
14,400	72,000	.002433	.000066	....	....	Elastic limit. Load fell.
13,000	65,000	.003500	.001067	....	....	
13,200	66,000	.004667	.001167	....	....	
13,400	67,000	.010000	.005333	....	....	
13,600	68,000	.013333	.003333	....	....	
13,800	69,000	.014000	.000667	....	....	
14,000	70,000	.014667	.000667	....	....	
14,400	72,000	.015933	.001266	....	....	
14,800	74,000	.017667	.001734	....	....	
15,200	76,000	.019500	.001833	....	....	
16,000	80,000	.024000	.004500	....	....	
16,800	84,000	.028333	.004333	....	....	
17,600	88,000	.033100	.004767	....	....	
18,400	92,000	.038733	.005633	....	....	
19,200	96,000	.046667	.007934	....	....	
20,000	100,000	.0576	.010033	....	....	
20,800	104,000	.0733	.0166	....	....	
21,600	108,000	.1100	.0367	....	....	
21,640	108,200	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	108,200
Elastic limit per square inch of original section	do...	72,000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.002433
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		1''.05 from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		''.11, ''.18, ''.31*

No. 5973.

Marks, 50 T E.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000667	.000367	....	....	
6,000	30,000	.001000	.000333	....	....	
8,000	40,000	.001333	.000338	....	....	
10,000	50,000	.001667	.000334	....	....	
12,000	60,000	.002033	.000366	0.	....	
13,000	65,000	.002233	.000200	....	....	
14,000	70,000	.002400	.000167	0.	....	
14,200	71,000	.002467	.000067	....	....	
14,400	72,000	.002500	.000033	....	....	
14,600	73,000	.002533	.000033	....	....	
14,800	74,000	.002567	.000034	....	....	
15,000	75,000	.002600	.000033	....	....	Elastic limit.
						Load fell.
13,800	69,000	.004033	.001433	....	....	
14,000	70,000	.005833	.001800	....	....	
14,200	71,000	.009167	.003334	....	....	
14,400	72,000	.011233	.002066	....	....	
14,800	74,000	.012000	.000767	....	....	
15,200	76,000	.013667	.001667	....	....	
15,600	78,000	.015267	.001600	....	....	
16,000	80,000	.016667	.001400	....	....	
16,800	84,000	.020000	.003333	....	....	
17,600	88,000	.023667	.003667	....	....	
18,400	92,000	.027500	.003833	....	....	
19,200	96,000	.032333	.004833	....	....	
20,000	100,000	.037333	.005000	....	....	
20,800	104,000	.042833	.005500	....	....	
21,600	108,000	.0500	.007167	....	....	
22,400	112,000	.0600	.0100	....	....	
23,200	116,000	.0833	.0233	....	....	
23,580	117,900	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	117,900
Elastic limit per square inch of original section	do	75,000
Elongation per inch after rupture	inch	.1800
Elongation per inch under strain at elastic limit	do	.002600
Reduction in diameter at point of rupture	do	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		1″.1 from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		″.24*, ″.20, ″.10

No. 5974.

Marks, 50 T I.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000633	.000333	....	....	
6,000	30,000	.001000	.000367	....	....	
8,000	40,000	.001333	.000333	....	....	
10,000	50,000	.001667	.000334	....	....	
12,000	60,000	.002000	.000333	0.	....	
13,800	69,000	.002300	.000300	....	....	Elastic limit.
14,000	70,000	.003433	.001133	....	....	
						Load fell.
12,600	63,000	.003800	.000367	....	....	
12,800	64,000	.004200	.000400	....	....	
13,000	65,000	.007333	.003133	....	....	
13,200	66,000	.011000	.003667	....	....	
13,400	67,000	.011333	.000333	....	....	
13,600	68,000	.011700	.000367	....	....	
13,800	69,000	.012667	.000967	....	....	
14,000	70,000	.013933	.001266	....	....	
14,400	72,000	.015167	.001234	....	....	
14,800	74,000	.016600	.001433	....	....	
15,200	76,000	.018333	.001733	....	....	
15,600	78,000	.020233	.001900	....	....	
16,000	80,000	.022000	.001767	....	....	
16,800	84,000	.026500	.004500	....	....	
17,600	88,000	.031000	.004500	....	....	
18,400	92,000	.036333	.005333	....	....	
19,200	96,000	.043000	.006667	....	....	
20,000	100,000	.053333	.010333	....	....	
20,800	104,000	.0667	.013367	....	....	
21,600	108,000	.0933	.0266	....	....	
21,780	108,900	.1267	.0334	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds..	108,900
Elastic limit per square inch of original section .... do...	69,000
Elongation per inch after rupture .... inch..	.1967
Elongation per inch under strain at elastic limit .... do...	.002300
Reduction in diameter at point of rupture .... do...	.125
Reduction in area after rupture, per cent of original section	43.3
Position of rupture	1″.21 from neck
Character of broken surface	fine silky, cup shaped
Elongation of inch sections	″.11, ″.27*, ″.21*

No. 5975.

Marks, 50 T I C.
Diameter,* ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000633	.000333	....	....	
6,000	30,000	.000967	.000334	....	....	
8,000	40,000	.001333	.000366	....	....	
10,000	50,000	.001667	.000334	....	....	
12,000	60,000	.002000	.000333	0.	....	
14,000	70,000	.002367	.000367	....	....	
14,800	74,000	.002533	.000166	....	....	
15,000	75,000	.002600	.000067	....	....	
15,200	76,000	.002633	.000033	....	....	Elastic limit.
						Load fell.
14,000	70,000	.003567	.000934	....	....	
14,200	71,000	.004367	.000800	....	....	
14,400	72,000	.012000	.007633	....	....	
14,600	73,000	.012333	.000333	....	....	
14,800	74,000	.012933	.000600	....	....	
15,000	75,000	.013667	.000734	....	....	
15,200	76,000	.014367	.000700	....	....	
15,600	78,000	.016000	.001633	....	....	
16,000	80,000	.017600	.001600	....	....	
16,800	84,000	.021500	.003900	....	....	
17,600	88,000	.024733	.003233	....	....	
18,400	92,000	.029000	.004267	....	....	
19,200	96,000	.033333	.004333	....	....	
20,000	100,000	.038700	.005367	....	....	
20,800	104,000	.0467	.0080	....	....	
21,600	108,000	.0567	.0100	....	....	
22,400	112,000	.0667	.0100	....	....	
23,200	116,000	.1000	.0333	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds.. 116,000
Elastic limit per square inch of original section ....do... 76,000
Elongation per inch after rupture ....inch.. .1667
Elongation per inch under strain at elastic limit............do... .002633
Reduction in diameter at point of rupture ....do... .125
Reduction in area after rupture, per cent of original section............ 43.3
Position of rupture............ 1″.27 from neck
Character of broken surface............ fine silky, cup shaped
Elongation of inch sections............ ″.09, ″.23*, ″.18

No. 5976.

Marks, 50 T I E.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000183	.000133	0.	....	
2,000	10,000	.000300	.000167	....	....	
4,000	20,000	.000638	.000333	....	....	
6,000	30,000	.000967	.000334	....	....	
8,000	40,000	.001333	.000366	....	....	
10,000	50,000	.001667	.000334	....	....	
12,000	60,000	.002033	.000366	.000033	.000033	
13,800	69,000	.002367	.000334	....	....	Elastic limit.
14,000	70,000	.002533	.000166	....	....	
						Load fell.
13,000	65,000	.007267	.004734	....	....	
13,200	66,000	.011433	.004166	....	....	
13,400	67,000	.012000	.000567	....	....	
13,600	68,000	.012733	.000733	....	....	
13,800	69,000	.013100	.000367	....	....	
14,000	70,000	.013500	.000400	....	....	
14,400	72,000	.015333	.001833	....	....	
14,800	74,000	.017000	.001667	....	....	
15,200	76,000	.020833	.003833	....	....	
16,000	80,000	.022667	.001834	....	....	
16,800	84,000	.027667	.005000	....	....	
17,600	88,000	.031733	.004066	....	....	
18,400	92,000	.037167	.005434	....	....	
19,200	96,000	.0433	.006133	....	....	
20,000	100,000	.0533	.0100	....	....	
20,800	104,000	.0700	.0167	....	....	
21,600	108,000	.0967	.0267	....	....	
21,710	108,550	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	108,550
Elastic limit per square inch of original section ....do...	69,000
Elongation per inch after rupture............inch..	.2067
Elongation per inch under strain at elastic limit ....do...	.002367
Reduction in diameter at point of rupture............do...	.135
Reduction in area after rupture, per cent of original section	46.2
Position of rupture	1″.4 from neck
Character of broken surface	fine silky; cup shaped
Elongation of inch sections............	″.18, ″.32*, ″.12

TABULATION OF TENSION SPECIMENS FROM RIFLE-BARREL STEEL (LENGTH OF STEMS 3″).

No. of test.	Mark on specimen.	Diameter.	Sectional area.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation in 3 inches.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.	Remarks.
		Inch.	*Sq. in.*	*Pounds.*	*Pounds.*	*Per ct.*	*Per ct.*		″ ″ ″	
5727	75-3	.505	.20	75,000	121,150	18.7	43.3	Fine silky, cup shaped	.13, .31*, .12	
5728	75-S	.505	.20	74,000	118,050	19.0	46.2	do	.17, .30*, .10	
5729	76	.505	.20	75,000	117,700	18.7	46.2	do	.18, .28*, .10	
5730	77	.505	.20	60,000	90,650	23.0	40.3	Silky, interspersed with fine granulation, cup shaped.	.23, .31*, .15	
5731	S-1	.505	.20	67,000	113,950	17.7	30.7	Fine silky, cup shaped	.16, .26*, .11	
5752	A I	.505	.20	75,000	118,950	17.7	51.9	Fine silky, dark gray, serrated edges	.30*, .14, .09	From forged form for barrel.
5753	A I	.505	.20	82,000	109,700	18.3	43.3	Fine silky, dark gray, irregular surface	.23*, .22*, .10	Do.
5763	S	.505	.20	75,000	120,000	17.3	40.3	Fine silky, trace of granulation	.11, .29*, .12	
5776	78	.505	.20	70,000	116,400	19.0	49.1	Fine silky, cup shaped	.11, .32*, .14	
5785	79	.505	.20	64,000	101,650	22.7	46.2	Silky	.15, .38*, .15	
5805	78	.505	.20	69,000	111,200	21.3	49.1	do	.14, .36*, .14	
5831	78-2	.505	.20	71,000	118,100	17.0	43.3	Fine silky	.29*, .12, .09	
5872	78	.505	.20	71,000	118,050	18.7	40.3	Fine silky, cup shaped	.12, .23*, .21*	
5873	78 F	.505	.20	51,000	104,200	16.7	27.4	Fine granular, silky center	.11, .16, .23*	
5876	78	.588 .300	.20	39,000	92,600	21.7	....	Silky	.14, .31*, .20	Reamed barrel.
5877	78	.588 .300	.20	([1])	99,200	21.0	....	Fine silky	.15, .35*, .13	Do.
5878	78 T	.588 .300	.20	([1])	101,900	6.7	....	Fine granular, 65 per cent; silky, 35 per cent.	.17*, .02, .01	Reamed barrel oil tempered.
5879	78 T	.588 .300	.20	53,000	95,600	21.3	....	Silky	.14, .33*, .17	Do.
5901	78	.505	.20	71,000	110,600	19.3	43.3	Fine silky	.28*, .18, .12	Barrel stock.
5902	78 A	.505	.20	53,000	105,850	18.7	30.7	Fine silky, trace of granulation	.14, .29*, .13	Butt of rolled barrel, annealed.
5903	78 T	.588 .300	.20	38,000	104,800	17.3	....	Silky, traces of granulation	.29*, .12, .11	Butt of barrel, oil tempered.
5904	78 T	.588 .300	.20	40,000	117,550	14.0	....	Granular, 60 per cent; silky, 40 per cent.	.09, .11, .22*	Do.
5905	78 F	.588 .300	.20	60,000	104,500	19.3	....	Fine silky	.15, .30*, .13	Butt of finished barrel, without oil tempering.
5906	78 F	.588 .300	.20	60,000	118,050	16.0	....	Fine granular	.12, .24*, .12	Do.
5926	78	.505	.20	65,000	108,550	20.3	46.2	Fine silky	....	Regular rolled barrel, annealed in charcoal.
5927	78	.505	.20	64,000	96,200	24.0	51.9	Fine silky, cup shaped	.14, .33*, .25*	Do.
5928	78 A	.505	.20	66,000	116,000	16.3	40.3	Silky, trace of granulation	....	Regular rolled barrel, cooled in air.
5929	78 A	.505	.20	64,000	113,900	16.3	37.1	Silky, interspersed with granular metal.	.09, .24*, .16*	Do.
5930	78 A F	.588 .300	.20	62,000	114,300	16.3	....	Silky, trace of granulation	.26*, .14, .09	Barrel cooled in air, without oil tempering.

5931	78 A F....	.588 .300	.20	69,000	120,550	15.7	....	.....do	.24*, .15, .08	Do.
5932	78 A T....	.588 .300	.20	61,000	116,500	15.7	....	Silky	.21*, .17, .09	Barrel oil tempered, and then cooled in air.
5933	78 A T....	.588 .300	.20	49,000	109,600	11.7	....	.....do	.02, .05, .28*	Do.
5934	Xa........	.588 .300	.20	57,000	104,100	20.0	....	Fine silky	31*, .17, .12	Barrel slightly heated at butt to remove hard spot near bottom of chamber caused by proving.
5935	Xa........	.588 .300	.20	69,000	106,300	17.3	....	.....do	.08, .10, .34*	Do.
5942	79 S.......	.505	.20	71,000	115,300	18.7	40.3	.....do	.12, .31*, .13	
5947	78	.505	.20	68,000	102,100	21.3	46.2	Fine silky, cup shaped	.28*, .24*, .12	Regular stock rolled at a low heat, and packed in charcoal to anneal.
5948	78	.505	.20	75,000	111,700	19.0	49.1	.....do	.09, .15, .33*	Do.
5949	78	.505	.20	69,000	102,950	19.7	46.2	Fine silky	.24*, .26*, .09	Regular stock rolled at a low heat, finished at a low heat, and cooled in the air.
5950	78	.505	.20	76,000	115,700	17.0	49.1	Fine silky, cup shaped	.07, .11, .33*	Do.
5971	50 T	.505	.20	73,000	116,700	18.7	43.3	.....do	.12, .32*, .12	
5972	50 T A....	.505	.20	72,000	108,200	20.0	46.2	.....do	.11, .18, .31*	
5973	50 T E....	.505	.20	75,000	117,900	18.0	43.3	.....do	.24*, .20, .10	
5974	50 T I	.505	.20	69,000	108,900	19.7	43.3	.....do	.11, .27*, .21*	
5975	50 T I C ..	.505	.20	76,000	116,000	16.7	43.3	.....do	.09, .23*, .18	
5976	50 T I E ..	.505	.20	69,000	108,550	20.7	46.2	.....do	.18, .32*, .12	

[1] Not well defined.

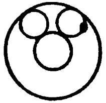
Note.—Where two diameters are given the specimens were hollow, and the figures indicate the exterior diameter and diameter of bore respectively.

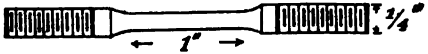
RIFLE BARRELS, .30 CALIBER.

SPECIMENS FROM BUTT ENDS OF TREATED BARRELS.

TENSION TESTS OF SPECIMENS CUT FROM THE BUTT ENDS OF 10 RIFLE BARRELS, .30 CALIBER.

Two barrels of each kind of treatment, and two specimens taken from each barrel.





BARRELS PROVED.

No. of test.	Marks.	Description.	Diameter.	Sectional area.	Elastic limit.		Tensile strength.		Elongation in 1 inch.		Area at fracture.		Contraction of area.	Appearance of fracture.
					Total.	Per sq. inch.	Total.	Per sq. inch.			Diameter.	Area.		
			Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Per cent.*	*Inch.*	*Sq. inch.*	*Per cent.*	
9458	78 P.......	Same barrel...	.1495	.0175	1,040	59,430	1,986	113,490	.17	17	.117	.0107	38.9	Silky.
9459	78 P.......		.1499	.0176	1,054	59,890	1,984	112,730	.17	17	.118	.0109	38.1	Do.
9460	78 P.......	Same barrel...	.1487	.0176	808	45,910	1,633	92,780	.24	24	.117	.0107	39.2	Do.
9461	78 P.......		.1498	.0176	765	43,470	1,627	92,440	.21	21	.116	.0106	39.8	Do.
BARRELS PROVED, HEATED AT BUTT, AND ANNEALED IN CHARCOAL.														
9462	78 P A....	Same barrel...	.1498	.0176	972	55,230	1,785	114,200	.19	19	.108	.0092	47.7	Silky.
9463	78 P A....		.1500	.0177	880	49,720	1,768	99,890	.19	19	.103	.0083	53.1	Do.
9464	78 P A....	Same barrel...	.1498	.0176	1,051	59,720	1,897	107,780	.20	20	.104	.0085	51.7	Do.
9465	78 P A....		.1498	.0176	1,081	61,420	1,906	108,300	.20	20	.105	.0087	50.6	Do.
BARRELS FINISHED EXCEPT "TEMPERING."														
9466	78.........	Same barrel...	.1499	.0176	1,146	65,110	2,052	116,590	.19	19	.114	.0102	42.0	Silky.
9467	78.........		.1498	.0176	1,150	65,340	2,058	116,930	.17	17	.116	.0106	39.8	Do.
9468	78.........	Same barrel...	.1499	.0176	1,040	59,090	1,968	111,820	.16	16	.126	.0125	29.0	Granular, in part silky.
9469	78.........		.1500	.0177	985	55,650	1,934	109,270	.17	17	.125	.0123	30.5	Do.

BARRELS 78 P. FINISHED.

No. of test.	Marks.	Description.	Diameter.	Sectional area.	Elastic limit.		Tensile strength.		Elongation in 1 inch.		Area at fracture.		Contraction of area.	Appearance of fracture.
					Total.	Per sq. inch.	Total.	Per sq. inch.			Diameter.	Area.		
			Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Per cent.*	*Inch.*	*Sq. inch.*	*Per cent.*	
9470	78........	Same barrel...	.1495	.0175	990	56,570	1,941	110,910	.17	17	.121	.0115	34.3	Silky, in part granular.
9471	78........		.1498	.0176	1,015	57,670	1,956	111,140	.17	17	.125	.0123	30.1	Granular, in part silky.
9472	78........	Same barrel...	.1498	.0176	1,095	62,220	1,887	107,220	.21	21	.114	.0102	42.0	Silky.
9473	78........		.1498	.0176	1,054	59,890	1,847	104,940	.22	22	.112	.0098	44.3	Do.

BARRELS 78 P. A. FINISHED.

No. of test.	Marks.	Description.	Diameter.	Sectional area.	Elastic limit. Total.	Elastic limit. Per sq. inch.	Tensile strength. Total.	Tensile strength. Per sq. inch.	Elongation in 1 inch.	Elongation in 1 inch.	Area at fracture. Diameter.	Area at fracture. Area.	Contraction of area.	Appearance of fracture.
9474	78 A	Same barrel...	.1499	.0176	1,257	71,420	2,006	113,980	.21	21	.109	.0093	47.2	Silky.
9475	78 A		.1499	.0176	1,248	70,910	2,006	113,980	.18	18	.110	.0095	46.0	Do.
9476	78 A	Same barrel...	.1500	.0177	1,151	65,030	2,004	113,220	.18	18	.114	.0102	42.4	Do.
9477	78 A		.1498	.0176	1,105	62,780	2,008	114,090	.20	20	.118	.0109	38.1	Do.

RECEIVERS OF RIFLES, .30 CALIBER.

No. 5784.

Marks, 34 R E.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000633	.000333	....	....	
6,000	30,000	.000967	.000334	0.	....	
6,200	31,000	.001000	.000033	....	....	
6,800	34,000	.001200	.000200	....	....	Elastic limit.
7,000	35,000	.021333	.020133	....	....	
7,200	36,000	.022167	.000834	....	....	
7,400	37,000	.024000	.001833	....	....	
7,600	38,000	.027167	.003167	....	....	
7,800	39,000	.029333	.002166	....	....	
8,000	40,000	.031667	.002334	....	....	
8,400	42,000	.041333	.009666	....	....	
8,800	44,000	.048833	.007500	....	....	
9,200	46,000	.058333	.009500	....	....	
9,600	48,000	.070000	.011667	....	....	
10,000	50,000	.083667	.013667	....	....	
10,400	52,000	.101667	.018000	....	....	
10,800	54,000	.131333	.029666	....	....	
11,000	55,000	.160667	.029334	....	....	
11,200	56,000	.1967	.036033	....	....	
11,220	56,100	.2167	.0200	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	56,100
Elastic limit per square inch of original section	inch..	34,000
Elongation per inch after rupture	do...	.3400
Elongation per inch under strain at elastic limit	do...	.001200
Reduction in diameter at point of rupture	do...	.205
Reduction in area after rupture, per cent of original section		64.7
Position of rupture		1″.7 from neck
Character of broken surface		silky
Elongation of inch sections		″.22, ″.55*, ″.25

No. 5795.

Marks, 36 R.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000600	.000300	....	....	
6,000	30,000	.000933	.000333	....	....	
8,000	40,000	.001300	.000367	....	....	
10,000	50,000	.001700	.000400	.000033	.000033	
10,200	51,000	.001767	.000067	....	....	Elastic limit. Load fell.
9,200	46,000	.005233	.003466	....	....	
9,400	47,000	.009333	.004100	....	....	
9,600	48,000	.011333	.002000	....	....	
9,800	49,000	.012267	.000934	....	....	
10,000	50,000	.013067	.000800	....	....	
10,200	51,000	.014000	.000933	....	....	
10,400	52,000	.015333	.001333	....	....	
10,800	54,000	.017933	.002600	....	....	
11,200	56,000	.020567	.002634	....	....	
11,600	58,000	.023667	.003100	....	....	
12,000	60,000	.027333	.003666	....	....	
12,400	62,000	.030633	.003300	....	....	
12,800	64,000	.034067	.003434	....	....	
13,200	66,000	.039000	.004933	....	....	
13,600	68,000	.044267	.005267	....	....	
14,000	70,000	.049167	.004900	....	....	
14,400	72,000	.055700	.006533	....	....	
14,800	74,000	.065833	.010133	....	....	
15,000	75,000	.071267	.005434	....	....	
15,200	76,000	.0800	.008733	....	....	
15,600	78,000	.0933	.0133	....	....	
16,000	80,000	.1233	.0300	....	....	
16,130	80,650	.1600	.0367	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	80,650
Elastic limit per square inch of original section	do...	51,000
Elongation per inch after rupture	inch..	.2400
Elongation per inch under strain at elastic limit	do...	.001767
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		37.1
Position of rupture		1″.25 from neck
Character of broken surface		silky
Elongation of inch sections		″.25,* ″.30,* ″.17

No. 5796.

Marks, 36 R F.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch,	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000633	.000333	....	....	
6,000	30,000	.000967	.000334	....	....	
8,000	40,000	.001300	.000333	0.	....	
10,000	50,000	.001667	.000367	0.	....	
11,000	55,000	.001767	.000100	....	....	Elastic limit.
						Load fell.
10,200	51,000	.004500	.002733	....	....	
10,400	52,000	.006000	.001500	....	....	
10,600	53,000	.007367	.001367	....	....	
10,800	54,000	.008900	.001533	....	....	
11,000	55,000	.010500	.001600	....	....	
11,200	56,000	.013667	.003167	....	....	
11,600	58,000	.023600	.009933	....	....	
12,000	60,000	.025333	.001733	....	....	
12,400	62,000	.028400	.003067	....	....	
12,800	64,000	.031733	.003333	....	....	
13,200	66,000	.036000	.004267	....	....	
13,600	68,000	.040000	.004000	....	....	
14,000	70,000	.045167	.005167	....	....	
14,400	72,000	.050333	.005166	....	....	
14,800	74,000	.058367	.008034	....	....	
15,200	76,000	.066000	.007633	....	....	
15,600	78,000	.077667	.011667	....	....	
16,000	80,000	.092333	.014666	....	....	
16,400	82,000	.1233	.030967	....	....	
16,640	83,200	.1600	.0367	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	83,200
Elastic limit per square inch of original section	do...	55,000
Elongation per inch after rupture	inch..	.2367
Elongation per inch under strain at elastic limit	do...	.001767
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		1″.2 from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		″.25*, ″.28* ″.18

NOT FORGED.

No. 5806.

Marks, 37 R.
Diameter, ''.505.
Sectional area, .20 square inch.
Gauged length, 3''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000067	.000067	0.	....	
2,000	10,000	.000300	.000233	....	....	
4,000	20,000	.000567	.000267	....	....	
6,000	30,000	.000932	.000366	....	....	
7,000	35,000	.001133	.000200	....	....	
7,600	38,000	.001267	.000134	....	....	
7,800	39,000	.001300	.000033	....	....	Elastic limit.
						Load fell.
6,600	33,000	.002900	.001600	....	....	
6,800	34,000	.004000	.001100	....	....	
7,000	35,000	.009667	.005667	....	....	
7,200	36,000	.017167	.007500	....	....	
7,400	37,000	.019000	.001833	....	....	
7,600	38,000	.021333	.002333	....	....	
7,800	39,000	.023833	.002500	....	....	
8,000	40,000	.027300	.003467	....	....	
8,400	42,000	.033667	.006367	....	....	
8,800	44,000	.040833	.007166	....	....	
9,200	46,000	.048333	.007500	....	....	
9,600	48,000	.055333	.007000	....	....	
10,000	50,000	.067333	.012000	....	....	
10,400	52,000	.080367	.013034	....	....	
10,800	54,000	.096667	.016300	....	....	
11,830	59,150	.119333	.022666	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	59,150
Elastic limit per square inch of original section	do...	39,000
Elongation per inch after rupture	inch..	.3633
Elongation per inch under strain at elastic limit	do...	.001300
Reduction in diameter at point of rupture	do...	.175
Reduction in area after rupture, per cent of original section		57.2
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		''.26, ''.56*, ''.27

FORGED.

No. 5807.

Marks, 37 R F.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000067	.000067	0.	....	
2,000	10,000	.000300	.000233	....	....	
4,000	20,000	.000633	.000333	....	....	
6,000	30,000	.000967	.000334	....	....	
8,000	40,000	.001300	.000333	0.	....	
8,200	41,000	.001333	.000033	....	....	Elastic limit.
						Load fell.
7,200	36,000	.002933	.001600	....	....	
7,400	37,000	.003400	.000467	....	....	
7,600	38,000	.005667	.002267	....	....	
7,800	39,000	.007333	.001666	....	....	
8,000	40,000	.010000	.002667	....	....	
8,400	42,000	.027333	.017333	....	....	
8,800	44,000	.032033	.004700	....	....	
9,200	46,000	.039333	.007300	....	....	
9,600	48,000	.048100	.008767	....	....	
10,000	50,000	.056667	.008567	....	....	
10,400	52,000	.070000	.013333	....	....	
10,800	54,000	.083333	.013333	....	....	
11,200	56,000	.104333	.021000	....	....	
11,920	59,600	.2033	.098967	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	59,600
Elastic limit per square inch of original section........do...	41,000
Elongation per inch after rupture........inch..	.2967
Elongation per inch under strain at elastic limit........do...	.001333
Reduction in diameter at point of rupture........do...	.205
Reduction in area after rupture, per cent of original section........	64.7
Position of rupture........	″.75 from neck
Character of broken surface........	silky
Elongation of inch sections........	″.19, ″.20, ″.50*

NOT FORGED.

No. 5832.

Marks, 37 R 2.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	....	
2,000	10,000	.000333	.000200	....	....	
4,000	20,000	.000667	.000334	....	....	
6,000	30,000	.001000	.000333	0.	....	
7,000	35,000	.001167	.000167	....	....	
8,000	40,000	.001367	.000200	....	....	
9,000	45,000	.001533	.000166	....	....	
10,000	50,000	.001767	.000234	....	....	
11,000	55,000	.001933	.000166	....	....	
11,600	58,000	.002033	.000100	....	....	Elastic limit.
						Load fell.
11,000	55,000	.007167	.005134	....	....	
11,200	56,000	.009333	.002166	....	....	
11,400	57,000	.011333	.002000	....	....	
11,600	58,000	.013333	.002000	....	....	
11,800	59,000	.014100	.000767	....	....	
12,000	60,000	.015433	.001333	....	....	
12,400	62,000	.017667	.002234	....	....	
12,800	64,000	.020500	.002833	....	....	
13,200	66,000	.023000	.002500	....	....	
13,600	68,000	.025667	.002667	....	....	
14,000	70,000	.029333	.003666	....	....	
14,800	74,000	.036000	.006667	....	....	
15,600	78,000	.045500	.009500	....	....	
16,400	82,000	.058000	.012500	....	....	
17,200	86,000	.0800	.0220	....	....	
18,020	90,100	.1500	.0700	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	90,100
Elastic limit per square inch of original section	do...	58,000
Elongation per inch after rupture	inch..	.2400
Elongation per inch under strain at elastic limit	do...	.002033
Reduction in diameter at point of rupture	do...	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		at middle of stem
Character of broken surface		fine silky
Elongation of inch sections		″.16, ″.39*, ″.17

FORGED.

No. 5833.

Marks, 37 R F 2.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	....	
2,000	10,000	.000300	.000167	....	....	
4,000	20,000	.000633	.000333	....	....	
6,000	30,000	.000967	.000334	0.	....	
7,000	35,000	.001133	.000166	....	....	
8,000	40,000	.001300	.000167	....	....	
9,000	45,000	.001433	.000133	....	....	
10,000	50,000	.001667	.000234	....	....	
11,000	55,000	.001800	.000133	....	....	
11,800	59,000	.002000	.000200	....	....	Elastic limit.
						Load fell.
10,800	54,000	.003333	.001333	....	....	
11,000	55,000	.004067	.000734	....	....	
11,200	56,000	.007000	.002933	....	....	
11,400	57,000	.012333	.005333	....	....	
11,600	58,000	.013167	.000834	....	....	
11,800	59,000	.013733	.000566	....	....	
12,000	60,000	.015000	.001267	....	....	
12,400	62,000	.017400	.002400	....	....	
12,800	64,000	.020333	.002933	....	....	
13,200	66,000	.023000	.002667	....	....	
14,000	70,000	.029167	.006167	....	....	
14,800	74,000	.037067	.007900	....	....	
15,600	78,000	.048167	.011100	....	....	
16,400	82,000	.059667	.011500	....	....	
17,200	86,000	.085000	.025333	....	....	
17,940	89,700	.1667	.0817	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	89,700
Elastic limit per square inch of original section	do...	59,000
Elongation per inch after rupture	inch..	.2833
Elongation per inch under strain at elastic limit	do...	.002000
Reduction in diameter at point of rupture	do...	.145
Reduction in area after rupture, per cent of original section		49.1
Position of rupture		1" from neck
Character of broken surface		fine silky, cup shaped
Elongation of inch sections		".14, ".18, ".38*

No. 5874.

Marks, R.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000633	.000333	....	....	
6,000	30,000	.000967	.000334	....	....	
8,000	40,000	.001300	.000333	0.	....	
8,400	42,000	.001367	.000067	....	....	
8,600	43,000	.001400	.000033	....	....	Elastic limit.
8,800	44,000	.002633	.001233	....	....	
						Load fell.
7,000	35,000	.002733	.000100	....	....	
7,200	36,000	.003033	.000300	....	....	
7,400	37,000	.005167	.002134	....	....	
7,600	38,000	.008233	.003066	....	....	
7,800	39,000	.010000	.001767	....	....	
8,000	40,000	.015667	.005667	....	....	
8,400	42,000	.018200	.002533	....	....	
8,800	44,000	.022000	.003800	....	....	
9,200	46,000	.025433	.003433	....	....	
9,600	48,000	.029100	.003667	....	....	
10,000	50,000	.033667	.004567	....	....	
10,400	52,000	.038800	.005133	....	....	
10,800	54,000	.043167	.004367	....	....	
11,200	56,000	.049900	.006733	....	....	
11,600	58,000	.056167	.006267	....	....	
12,000	60,000	.066000	.009833	....	....	
12,400	62,000	.077333	.011333	....	....	
12,800	64,000	.093333	.016000	....	....	
13,470	67,350	.193000	.099667	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	67,350
Elastic limit per square inch of original section	do	43,000
Elongation per inch after rupture	inch	.2900
Elongation per inch under strain at elastic limit	do	.001400
Reduction in diameter at point of rupture	do	.155
Reduction in area after rupture, per cent of original section		51.9
Position of rupture		1.″1 from neck
Character of broken surface		silky
Elongation of inch sections		″.20, ″.26, ″.41*

FORGED.

No. 5875.

Marks, R. F.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.		
2,000	10,000	.000300	.000200			
4,000	20,000	.000633	.000333			
6,000	30,000	.001000	.000367	.000033	.000033	Elastic limit.
6,200	31,000	.003333	.002333			
6,400	32,000	.009000	.005667			
6,600	33,000	.013000	.004000			
6,800	34,000	.014600	.001600			
7,000	35,000	.015333	.000733			
7,200	36,000	.017400	.002067			
7,400	37,000	.019067	.001667			
7,600	38,000	.020667	.001600			
7,800	39,000	.023167	.002500			
8,000	40,000	.024333	.001166			
8,400	42,000	.028333	.004000			
8,800	44,000	.032833	.004500			
9,200	46,000	.037500	.004667			
9,600	48,000	.044333	.006833			
10,000	50,000	.050000	.005667			
10,400	52,000	.056000	.006000			
10,800	54,000	.067000	.011000			
11,200	56,000	.076667	.009667			
11,600	58,000	.092000	.015333			
12,000	60,000	.114000	.022000			
12,400	62,000	.164333	.050333			
12,500	62,500	.2200	.055667			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	62,500
Elastic limit per square inch of original section	do...	30,000
Elongation per inch after rupture	inch..	.3467
Elongation per inch under strain at elastic limit	do...	.001000
Reduction in diameter at point of rupture	do...	.165
Reduction in area after rupture, per cent of original section		54.6
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		″.27, ″.52*, ″.25

No. 5007.

Marks, 37 R.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000067	.000067	0.	....	
2,000	10,000	.000300	.000233	....	....	
4,000	20,000	.000600	.000300	....	....	
6,000	30,000	.000933	.000333	0.	....	
8,000	40,000	.001267	.000334	0.	....	
8,200	41,000	.001300	.000033	....	....	
8,400	42,000	.001333	.000033	....	....	Elastic limit.
						Load fell.
7,000	35,000	.002367	.001034	....	....	
7,200	36,000	.002833	.000466	....	....	
7,400	37,000	.004667	.001834	....	....	
7,600	38,000	.007000	.002333	....	....	
7,800	39,000	.018367	.011367	....	....	
8,000	40,000	.019333	.000966	....	....	
8,200	41,000	.021233	.001900	....	....	
8,400	42,000	.023000	.001767	....	....	
8,800	44,000	.027333	.004333	....	....	
9,200	46,000	.031833	.004500	....	....	
9,600	48,000	.036667	.004834	....	....	
10,000	50,000	.042000	.005333	....	....	
10,400	52,000	.048333	.006333	....	....	
10,800	54,000	.056667	.008334	....	....	
11,200	56,000	.064667	.008000	....	....	
11,600	58,000	.076333	.011666	....	....	
12,000	60,000	.091667	.015334	....	....	
12,400	62,000	.116667	.025000	....	....	
12,800	64,000	.1667	.050033	....	....	
12,840	64,200	.2067	.0400	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section .... pounds..	64,200
Elastic limit per square inch of original section .... do...	42,000
Elongation per inch after rupture .... inch..	.3200
Elongation per inch under strain at elastic limit .... do...	.001833
Reduction in diameter at point of rupture .... do...	.185
Reduction in area after rupture, per cent of original section	59.8
Position of rupture	at middle of stem
Character of broken surface	fine silky
Elongation of inch sections	″.22, ″.51,* ″.23

FORGED.

No. 5908.

Marks 37 F.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 3".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000633	.000333	....	....	
6,000	30,000	.001000	.000367	0.	....	
7,000	35,000	.001167	.000167	....	....	
7,600	38,000	.001333	.000166	....	....	Elastic limit.
7,800	39,000	.002333	.001000	....	....	
8,000	40,000	.004267	.001934	.002933	.002933	
8,200	41,000	.009667	.005400	....	....	
8,400	42,000	.011000	.001333	....	....	
8,600	43,000	.012167	.001167	....	....	
8,800	44,000	.014167	.002000	....	....	
9,000	45,000	.016000	.001833	....	....	
9,200	46,000	.017667	.001667	....	....	
9,600	48,000	.020000	.002333	....	....	
10,000	50,000	.023667	.003667	....	....	
10,400	52,000	.028333	.004666	....	....	
10,800	54,000	.032000	.003667	....	....	
11,200	56,000	.036333	.004333	....	....	
11,600	58,000	.042000	.005667	....	....	
12,000	60,000	.050000	.008000	....	....	
12,400	62,000	.056667	.006667	....	....	
12,800	64,000	.064667	.008000	....	....	
13,200	66,000	.077667	.013000	....	....	
13,600	68,000	.089333	.011666	....	....	
14,000	70,000	.1167	.027367	....	....	
14,400	72,000	.1533	.0366	....	....	
14,530	72,650	.1867	.0334	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	72,650
Elastic limit per square inch of original section............do...	38,000
Elongation per inch after rupture............inch..	.2833
Elongation per inch under strain at elastic limit............do...	.001333
Reduction in diameter at point of rupture............do...	.155
Reduction in area after rupture, per cent of original section	51.9
Position of rupture............	1" from neck
Character of broken surface	fine silky
Elongation of inch sections	".18, ".22, ".45

TABULATION OF TENSION SPECIMENS FROM STEEL FOR RECEIVERS OF RIFLES (LENGTH OF STEMS 3").

No. of test.	Mark on specimen.	Diameter.	Sectional area.	Elastic limit per sq. inch.	Tensile strength per sq. inch.	Elongation in 3 inches.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.	Remarks.
		Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Per cent.*	*Per cent.*		" " "	
5784	34 R E	.505	.20	34,000	56,100	34.0	64.7	Silky	.22, .55*, .25	
5795	36 R	.505	.20	51,000	80,650	24.0	37.1	....do	.25, .30*, .17	
5796	36 R F	.505	.20	55,000	83,200	23.7	43.3	Fine silky, cup shaped	.25*, .28*, .18	
5806	37 R	.505	.20	39,000	59,150	36.3	57.2	Silky	.26, .56*, .27	Not forged.
5807	37 R F	.505	.20	41,000	59,600	29.7	64.7	....do	.19, .20, .50*	Forged.
5832	37 R 2	.505	.20	58,000	90,100	24.0	46.2	Fine silky	.16, .39*, .17	Not forged.
5833	37 R F 2	.505	.20	59,000	89,700	23.3	49.1	Fine silky, cup shaped	.14, .18, .38*	Forged.
5874	R	.505	.20	43,000	67,350	29.0	51.9	Silky	.20, .26, .41*	
5875	R F	.505	.20	30,000	62,500	34.7	54.6	....do	.27, .52*, .25	Do.
5907	37 R	.505	.20	42,000	64,200	32.0	59.8	Fine silky	.22, .51*, .23	
5908	37 F	.505	.20	38,000	72,650	28.3	51.9	....do	.18, .22, .45*	Do.

GATLING GUNS.

BARREL STEEL.

No. 5720.

Marks, C_6.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	....	
2,000	10,000	.000267	.000134	....	....	
4,000	20,000	.000633	.000366	....	....	
6,000	30,000	.000967	.000334	0.	....	
8,000	40,000	.001300	.000333	....	....	
10,000	50,000	.001667	.000367	0.	....	
12,000	60,000	.002033	.000366	....	....	
14,000	70,000	.002367	.000334	0.	....	
14,200	71,000	.002400	.000033	....	....	
14,400	72,000	.002433	.000033	....	....	Elastic limit.
14,600	73,000	.004333	.001900	....	....	
14,800	74,000	.006667	.002334	....	....	
15,000	75,000	.008667	.002000	....	....	
15,200	76,000	.009200	.000533	....	....	
15,400	77,000	.009667	.000467	....	....	
15,600	78,000	.010500	.000833	....	....	
15,800	79,000	.011333	.000833	....	....	
16,000	80,000	.011933	.000600	....	....	
16,400	82,000	.013000	.001067	....	....	
16,800	84,000	.014667	.001667	....	....	
17,600	88,000	.018000	.003333	....	....	
18,400	92,000	.022167	.004167	....	....	
19,200	96,000	.024000	.001833	....	....	
20,000	100,000	.028000	.004000	....	....	
20,800	104,000	.031667	.003667	....	....	
21,600	108,000	.037000	.005333	....	....	
22,400	112,000	.044667	.007667	....	....	
23,200	116,000	.052000	.007333	....	....	
24,000	120,000	.066000	.014000	....	....	
24,670	123,350	.1067	.0407	....	....	Tensile strength.

General summary.

Tensile strength, per square inch of original section	pounds..	123,350
Elastic limit, per square inch of original section	do...	72,000
Elongation per inch after rupture	inch..	.1833
Elongation per inch under strain at elastic limit	do...	.002433
Reduction in diameter at point of rupture	do...	.105
Reduction in area after rupture, per cent of original section		37.1
Position of rupture		at middle of stem
Character of broken surface		fine silky, dark gray; trace of granulation
Elongation of inch sections		″.13, ″.29*, ″.13

No. 5721.

Marks, C_7.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000133	.000133	0.	....	
2,000	10,000	.000300	.000167	....	....	
4,000	20,000	.000667	.000367	....	....	
6,000	30,000	.001033	.000366	....	....	
8,000	40,000	.001400	.000367	....	....	
10,000	50,000	.001733	.000333	0.	....	
12,000	60,000	.002033	.000300	0.	....	
14,000	70,000	.002400	.000367	....	....	
14,200	71,000	.002467	.000067	....	....	Elastic limit.
14,400	72,000	.003000 .010033	.000533 .007033	....	....	
14,600	73,000	.010700	.000667	....	....	
14,800	74,000	.011233	.000533	....	....	
15,000	75,000	.011833	.000600	....	....	
15,200	76,000	.012533	.000700	....	....	
15,600	78,000	.013767	.001234	....	....	
16,000	80,000	.015667	.001900	....	....	
16,800	84,000	.019000	.003333	....	....	
17,600	88,000	.022667	.003667	....	....	
18,400	92,000	.026667	.004000	....	....	
19,200	96,000	.031167	.004500	....	....	
20,000	100,000	.036000	.004833	....	....	
20,800	104,000	.042500	.006500	....	....	
21,600	108,000	.050333	.007833	....	....	
22,400	112,000	.064333	.014000	....	....	
23,200	116,000	.098333	.034000	....	....	
23,280	116,400	.1133	.014967	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	116,400
Elastic limit per square inch of original section	do ..	71,000
Elongation per inch after rupture	inch..	.1900
Elongation per inch under strain at elastic limit	do...	.002467
Reduction in diameter at point of rupture	do...	.125
Reduction in area after rupture, per cent of original section		43.3
Position of rupture		1″.6 from neck
Character of broken surface		fine silky; cup-shaped ends
Elongation of inch sections		″.12, ″.33*, ″.12

5-INCH R. F. GUN

WHICH BURST AT

SANDY HOOK PROVING GROUND.

TANGENTIAL SPECIMENS FROM FRAGMENTS OF TUBE AND JACKET.

No. 5881.

Marks, Tube 1.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000100	.000100	0.		
2, 000	10, 000	.000350	.000250			
4, 000	20, 000	.000600	.000250			
6, 000	30, 000	.000950	.000350			
7, 000	35, 000	.001100	.000150	0.		
8, 000	40, 000	.001400	.000300			
8, 400	42, 000	.001450	.000050	.000050	.000050	
8, 600	43, 000	.001450	0.			
8,800	44, 000	.001500	.000050			
9, 000	45, 000	.001550	.000050			
9, 200	46, 000	.001600	.000050			
9, 400	47, 000	.001600	0.			
9, 600	48, 000	.001650	.000050			
9, 800	49, 000	.001700	.000050			
10, 000	50, 000	.001800	.000100			
10, 200	51, 000	.001900	.000100			
10, 400	52, 000	.001950	.000050			
10, 600	53, 000	.002000	.000050			
10, 800	54, 000	.002050	.000050			
11, 000	55, 000	.002100	.000050			
11, 200	56, 000	.002150	.000050			
11, 400	57, 000	.002250	.000100			
11, 600	58, 000	.002350	.000100			
11. 800	59, 000	.002400	.000050			
12, 000	60, 000	.002450	.000050			
12, 200	61, 000	.002500	.000050			Elastic limit.
12, 400	62, 000	.002600	.000100			
12, 600	63, 000	.002700	.000100			
12, 800	64, 000	.002800	.000100			
13, 000	65, 000	.002900	.000100			
13, 200	66, 000	.003050	.000150	.000850	.000800	
13, 400	67, 000	.003450	.000400			
13, 600	68, 000	.003650	.000200			
13, 800	69, 000	.003900	.000250			
14, 000	70, 000	.004300	.000400			
14, 200	71, 000	.004500	.000200			
14, 400	72, 000	.005000	.000500			
14, 600	73, 000	.005900	.000900			
14, 800	74, 000	.006750	.000850			
15, 200	76, 000	.009750	.003000			
15, 600	78, 000	.014000	.004250			
16, 000	80, 000	.019000	.005000			
17, 810	89, 050					Tensile strength.

General summary.

Tensile strength, per square inch of original section	pounds	89, 050
Elastic limit, per square inch of original section	do	61, 000
Elongation per inch after rupture	inch	.2050
Elongation per inch under strain at elastic limit	do	.002500
Reduction in diameter at point of rupture	do	.125
Reduction in area after rupture, per cent of original section		43. 3
Position of rupture		″.95 from neck
Character of broken surface		silky
Elongation of inch sections		″.31*, ″.10

No. 5882.

Marks, Tube 2.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanant set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000350	.000250	....	....	
4,000	20,000	.000600	.000250	....	....	
6,000	30,000	.000950	.000350	....	....	
7,000	35,000	.001050	.000100	0.	....	
8,000	40,000	.001300	.000250	....	....	
8,400	42,000	.001400	.000100	0.	....	
8,600	43,000	.001450	.000050	....	....	
8,800	44,000	.001500	.000050	....	....	
9,000	45,000	.001550	.000050	....	....	
9,200	46,000	.001600	.000050	....	....	
9,400	47,000	.001650	.000050	....	....	
9,600	48,000	.001750	.000100	....	....	
9,800	49,000	.001850	.000100	....	....	
10,000	50,000	.001950	.000100	....	....	
10,200	51,000	.002000	.000050	....	....	
10,400	52,000	.002000	0.	....	....	
10,600	53,000	.002050	.000050	....	....	
10,800	54,000	.002100	.000050	....	....	Elastic limit.
11,000	55,000	.002300	.000200	....	....	
11,200	56,000	.002450	.000150	....	....	
11,400	57,000	.002550	.000100	....	....	
11,600	58,000	.002700	.000150	....	....	
11,800	59,000	.002950	.000250	....	....	
12,000	60,000	.003100	.000150	.000850	.000850	
12,200	61,000	.003300	.000200	....	....	
11,400	62,000	.003600	.000300	....	....	
12,600	63,000	.003950	.000350	....	....	
12,800	64,000	.004450	.000500	....	....	
13,000	65,000	.005100	.000650	....	....	
13,200	66,000	.006000	.000900	....	....	
13,400	67,000	.007250	.001250	....	....	
13,600	68,000	.008350	.001100	....	....	
13,800	69,000	.009500	.001150	....	....	
14,000	70,000	.011000	.001500	....	....	
14,400	72,000	.014500	.003500	....	....	
14,800	74,000	.018250	.003750	....	....	
15,200	76,000	.022500	.004250	....	....	
15,600	78,000	.028500	.006000	....	....	
16,000	80,000	.037150	.008650	....	....	
17,420	87,100	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	87,100.
Elastic limit per square inch of original section	do	54,000
Elongation per inch after rupture	inch	.2300
Elongation per inch under strain at elastic limit	do	.002100
Reduction in diameter at point of rupture	do	.135
Reduction in area after rupture, per cent of original section		46.2
Position of rupture		″.95 from neck
Character of broken surface		silky
Elongation of inch sections		″.15, ″.31*

No. 5883.

Marks, Tube 3.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000100	.000100	0.	....	
2, 000	10, 000	.000350	.000250	....	....	
4, 000	20, 000	.000600	.000250	....	....	
6, 000	30, 000	.000950	.000350	....	....	
7, 000	35, 000	.001100	.000150	0.	0.	
8, 000	40, 000	.001300	.000200	....	....	
8, 400	42, 000	.001400	.000100	.000050	.000050	
8, 600	43, 000	.001450	.000050	....	....	
8, 800	44, 000	.001500	.000050	....	....	
9, 000	45, 000	.001600	.000100	....	....	Elastic limit.
9, 200	46, 000	.003750	.002150	....	....	
9, 400	47, 000	.004900	.001150	....	....	
9, 600	48, 000	.005650	.000750	....	....	
9, 800	49, 000	.007000	.001350	....	....	
10, 000	50, 000	.007500	.000500	....	....	
10, 200	51, 000	.008500	.001000	....	....	
10, 400	52, 000	.009500	.001000	....	....	
10, 600	53, 000	.010100	.000600	....	....	
10, 800	54, 000	.011150	.001050	....	....	
11, 000	55, 000	.012000	.000850	....	....	
11, 200	56, 000	.013000	.001000	....	....	
11, 400	57, 000	.014000	.001000	....	....	
11, 600	58, 000	.015000	.001000	....	....	
11, 800	59, 000	.015900	.000900	....	....	
12, 000	60, 000	.016950	.001050	....	....	
12, 400	62, 000	.019150	.002200	....	....	
12, 800	64, 000	.021550	.002400	....	....	
13, 200	66, 000	.024400	.002850	....	....	
13, 600	68, 000	.027250	.002850	....	....	
14, 000	70, 000	.030150	.002900	....	....	
14, 400	72, 000	.033500	.003350	....	....	
14, 800	74, 000	.037600	.004100	....	....	
15, 200	76, 000	.041550	.003950	....	....	
15, 600	78, 000	.047750	.006200	....	....	
16, 000	80, 000	.054100	.006350	....	....	
17, 540	87, 700	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	87, 700
Elastic limit per square inch of original section	do...	45, 000
Elongation per inch after rupture	inch..	.2250
Elongation per inch under strain at elastic limit	do...	.001600
Reduction in diameter at point of rupture	do...	.115
Reduction in area after rupture, per cent of original section		40. 3
Position of rupture		at middle of stem
Character of broken surface		silky
Elongation of inch sections		″.22*, ″.23*

No. 5884.

Marks, Jacket 1.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000550	.000250	....	....	
6,000	30,000	.000950	.000400	....	....	
8,000	40,000	.001400	.000450	.000050	.000050	
9,200	46,000	.001650	.000250	.000150	.000100	Elastic limit.
9,400	47,000	.001950	.000300	....	....	
9,600	48,000	.002050	.000100	....	....	
9,800	49,000	.002250	.000200	....	....	
10,000	50,000	.002450	.000200	....	....	
10,200	51,000	.002800	.000350	....	....	
10,400	52,000	.003400	.000600	....	....	
10,600	53,000	.003950	.000550	....	....	
10,800	54,000	.004950	.001000	....	....	
11,000	55,000	.005600	.000650	....	....	
11,200	56,000	.006300	.000700	....	....	
11,400	57,000	.007600	.001300	....	....	
11,600	58,000	.008150	.000550	....	....	
11,800	59,000	.009000	.000850	....	....	
12,000	60,000	.010000	.001000	....	....	
12,400	62,000	.011600	.001600	....	....	
12,800	64,000	.013500	.001900	....	....	
13,200	66,000	.015450	.001950	....	....	
13,600	68,000	.017100	.001650	....	....	
14,000	70,000	.019350	.002250	....	....	
14,400	72,000	.022500	.003150	....	....	
14,800	74,000	.025150	.002650	....	....	
15,200	76,000	.028000	.002850	....	....	
15,600	78,000	.030250	.002250	....	....	
16,000	80,000	.034250	.004000	....	....	
19,010	95,050	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	95,050
Elastic limit per square inch of original section	do...	46,000
Elongation per inch after rupture	inch..	.1500
Elongation per inch under strain at elastic limit	do...	.001650
Reduction in diameter at point of rupture	do...	.045
Reduction in area after rupture, per cent of original section		16.9
Position of rupture		″.4 from neck
Character of broken surface		granular, radiating from a dull spot at the circumference
Elongation of inch sections		″.11, ″.19*

No. 5885.

Marks, Jacket 2.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000600	.000300	....	....	
6,000	30,000	.000950	.000350	....	....	
8,000	40,000	.001450	.000500	.000100	.000100	
9,200	46,000	.001950	.000500	.000250	.000150	
9,400	47,000	.002000	.000050	....	....	
9,600	48,000	.002050	.000050	....	....	
9,800	49,000	.002100	.000050	....	....	
10,000	50,000	.002200	.000100	....	....	
10,200	51,000	.002300	.000100	....	....	
10,400	52,000	.002350	.000050	....	....	
10,600	53,000	.002450	.000100	....	....	Elastic limit, approximate.
10,800	54,000	.002700	.000250	....	....	
11,000	55,000	.002950	.000250	.000850	.000600	
11,200	56,000	.003200	.000250	....	....	
11,400	57,000	.003500	.000300	....	....	
11,600	58,000	.003800	.000300	....	....	
11,800	59,000	.004250	.000450	....	....	
12,000	60,000	.004950	.000700	.002500	.001650	
12,400	62,000	.006150	.001200	....	....	
12,800	64,000	.008700	.002550	....	....	
13,200	66,000	.010500	.001800	....	....	
13,600	68,000	.013050	.002550	....	....	
14,000	70,000	.015200	.002150	....	....	
14,400	72,000	.018250	.003050	....	....	
14,800	74,000	.021400	.003150	....	....	
15,200	76,000	.025450	.004050	....	....	
15,600	78,000	.028900	.003450	....	....	
16,000	80,000	.035000	.006100	....	....	
18,510	92,550	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section..........pounds..	92,550
Elastic limit per square inch of original section (approximate)..........do...	53,000
Elongation per inch after rupture..........inch..	.2450
Elongation per inch under strain at elastic limit..........do...	.002450
Reduction in diameter at point of rupture..........do...	.135
Reduction in area after rupture, per cent of original section..........	.462
Position of rupture..........	″.75 from neck
Character of broken surface..........	silky
Elongation of inch sections..........	″.35*, ″.14

No. 5886.

Marks, Jacket 3.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

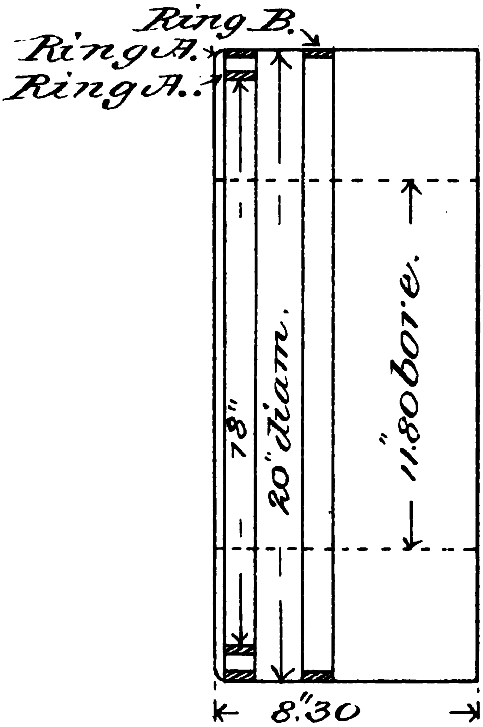
Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000100	.000100	0.	....	
2, 000	10, 000	.000300	.000200	....	....	
4, 000	20, 000	.000600	.000300	....	....	
6, 000	30, 000	.000950	.000350	....	....	
8, 000	40, 000	.001300	.000350	.000050	.000050	
						Elastic limit below 46,000 pounds per square inch.
9, 200	46, 000	.001900	.000600	.000400	.000350	
9, 400	47, 000	.002250	.000350	....	....	
9, 600	48, 000	.003000	.000750	....	....	
9, 800	49, 000	.004250	.001250	....	....	
10, 000	50, 000	.005050	.000800	....	....	
10, 200	51, 000	.006350	.001300	....	....	
10, 400	52, 000	.007500	.001150	....	....	
10, 600	53, 000	.008850	.001350	....	....	
10, 800	54, 000	.009250	.000400	....	....	
11, 000	55, 000	.009850	.000600	....	....	
11, 200	56, 000	.011000	.001150	....	....	
11, 400	57, 000	.012000	.001000	....	....	
11, 600	58. 000	.012900	.000900	....	....	
11, 800	59, 000	.013500	.000600	....	....	
12, 000	60, 000	.015150	.001650	....	....	
12, 400	62, 000	.017300	.002150	....	....	
12, 800	64, 000	.019500	.002200	....	....	
13, 200	66. 000	.022050	.002550	....	....	
13, 600	68, 000	.025000	.002950	....	....	
14, 000	70, 000	.027800	.002800	....	....	
14, 400	72, 000	.031100	.003300	....	....	
14, 800	74, 000	.034750	.003650	....	....	
15, 200	76, 000	.039500	.004750	....	....	
15, 600	78, 000	.044500	.005000	....	....	
16, 000	80, 000	.049750	.005250	....	....	
17, 900	89, 500	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds.. 89, 500
Elastic limit per square inch of original section	below 46,000 pounds
Elongation per inch after rupture	inch.. .2600
Reduction in diameter at point of rupture	do... .145
Reduction in area after rupture, per cent of original section	do... 49.1
Position of rupture	1″ from neck
Character of broken surface	silky
Elongation of inch sections	″.36*, ″.16

SECTION OF 12-INCH MORTAR TUBE.

Section of 12-inch Mortar Tube.



Lines of streaked metal were present in this forging.

Rings were taken out, cut apart diametrically, straightened, and then tested by tension.

The test of one sample represented the strength of the metal which contained a streaked line, the other half of the ring showing the strength of the metal which presented a uniform appearance on its surface.

RINGS TAKEN FROM 12-INCH MORTAR TUBE.

Specimens straightened cold. Nos. 9410 and 9411 heated after straightening.

No. of test.	Description.	Dimensions in inches.		Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 6 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.
		Width.	Thickness.		Total.	Per square inch.	Total.	Per square inch.	Inches.	Per cent.				
				Sq. in.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*				*Per ct.*		
9410	Ring A. (streak side).	.979	.067	.0656	....	....	6,140	93,590	......	......	″.960 × ″.066 = .0634 square inch. The minimum sectional area after testing was ¾″ from the place of fracture, where the dimensions were ″.952 × ″.062.	3.3	Granular; fractured along streak in the steel.	″ ″ ″ ″ ″ ″
9411	Ring A. (other side).	1.003	.252	.2528	13,260	52,450	22,380	88,530	.41	6.8	″.85 × ″.20 = .1700 sq. inch.	32.7	Granular 80 per cent, silky 20 per cent; fractured near end of reheated section.	.08, .08, .05, .05, .06, .09.
9412	Ring A. (streak side).	.996	.270	.2689	[1]13,600	50,580	23,420	87,090	.45	7.5	″.78 × ″.20 = .1560 sq. inch.	42.0	Silky; fractured 7″ distant from diametrical plane of streak.	.12, .07, .06, .06, .08, .06.
9413	Ring A. (other side).	.996	.270	.2689	[1]14,400	53,550	23,290	86,610	.91	15.2	″.81 × ″.21 = .1701 sq. inch.	36.7	Silky 90 per cent, granular 10 per cent.	.07, .08, .12, .13, .15, .36*.

[1] About.

RINGS TAKEN FROM 12-INCH MORTAR TUBE—Continued.

No. of test.	Description.	Dimensions in inches.		Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 3 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.
		Width.	Thickness.		Total.	Per square inch.	Total.	Per square inch.	Inches.	Per cent.				
				Sq. in.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*				*Per ct.*		
9414	Ring B. (streak side).	.999	.246	.2457	12,800	52,100	22,840	92,960	.34	11.3	″.951 × ″.235 = .2235 sq. inch. Specimen drew down to ″.934 × ″.229 = .2139 sq. inch at a distance of ¼″ from place of fracture.	9.0	Fine granular, radiating from a streak of laminated metal at one corner; opened cracks in the vicinity of fracture along the streaked lines, which were visible on the surface of the specimen before the test. Fractured along line of streaked metal. Dimensions of specimen beyond polished section ″1.007 × ″.253 = .2548 sq. inch.	.12, .12*, .10.
9415	Ring B. (other side).	1.008	.255	.2570	13,600	52,920	23,320	90,740	.65	21.7	″.80 × ″.40 = .1600 sq. inch.	37.7	Silky, oblique.........	.13, .35,* .17.

12-INCH DISAPPEARING CARRIAGE.

STEEL GUN LEVER AXLE.

TENACITY SPECIMENS.

No. of test.	Diameter.	Sectional area.	Tensile strength.		Appearance of fracture.
			Total.	Per square inch.	
	Inches.	*Sq. inch.*	*Pounds.*	*Pounds.*	
5486	1.129	1.00	122,450	122,450	Fine granular; fractured in head at root of thread.
5521	1.129	1.00	124,900	124,900	Granular, silvery luster; fractured in head at root of thread.

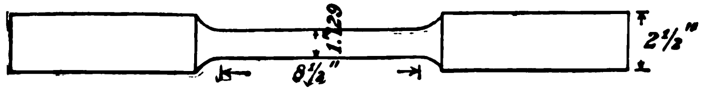
ANCHOR BOLTS

FOR

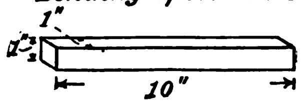
GUN AND MORTAR CARRIAGE PLATFORMS.

ORIGINAL DIAMETER OF BOLTS, 1¼ INCHES TO 2¼ INCHES.

Tension specimens.



Bending specimens.



No. of test.	Description.	Diameter.	Sectional area.	Elastic limit per sq. inch.	Tensile strength per sq. inch.	Elongation in 8 inches.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.	Bending tests.
		Inches.	*Sq. in.*	*Pounds.*	*Pounds.*	*Per cent.*	*Per cent.*		" " " "	
9338	For 10" disappearing carriage at Newport, R. I.	1.129	1.00	34,480	59,740	31.8	58.2	Silky, cup shaped.	.19, .25, .28, .60*, .48, .29, .25, .20	
9353	For gun and mortar platforms at Willetts Point, N. Y.	1.129	1.00	26,100	56,940	31.2	53.4	Silky	.19, .24, .27, .29, .31, .69*, .30, .20	Specimen bent cold 180° and closed down upon itself without fracture.
9355	For 12" guns at Great Diamond Island, Portland, Me.	1.129	1.00	31,380	60,540	30.5	51.0	do	.20, .23, .34, .63*, .31, .28, .26, .19	Specimen bent cold 180° without fracture. In closing down upon itself two shearing fractures developed on the inside of the bend.
9364	For gun platforms at Fort Schuyler, N. Y.	1.129	1.00	27,300	57,310	32.1	60.4	do	.20, .27, .57*, .53*, .30, .26, .24, .20	Specimen bent cold 180° and closed down upon itself without fracture on tension side.
9405	For 8" gun platforms at Fort Constitution, Portsmouth, N. H.	1.129	1.00	28,300	54,780	31.1	52.2	do	.20, .27, .53*, .49, .29, .27, .25, .19	Do.
9483	For mortar battery at Fort Preble, Me.	1.129	1.00	29,800	57,680	31.3	47.2	Fine silky	.21, .23, .25, .31, .53*, .47*, .27, .23	Do.
9487	For 8" gun platform at Key West, Fla.	1.127	.997	30,840	54,280	32.0	63.6	Fine silky, cup shaped.	.23, .27, .72*, .43, 25, .22, .21, .23	Specimens bent cold 180° and closed down upon themselves without fracture on tension side.
9488	For mortar platform at Key West, Fla.	1.127	.997	31,900	55,950	31.0	61.4	do	.26, .23, .21, .25, 36, .41, .64*, .22	
9489	For 10" gun platform at Key West, Fla.	1.127	.997	30,390	57,080	28.3	53.8	do	.21, .21, .20, .28, .67*, .26, .22, .21	

SAMPLES OF STEEL TAKEN FROM EYE BEAMS AND BOLTS FOR GUN EMPLACEMENTS ON TYBEE ISLAND, GA.

No. of test.	Mark on specimen.	Diameter.	Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 3 and 8 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.
				Total.	Per square inch.	Total.	Per square inch.	Inches.	Per cent.				
		Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*			*In. Sq. in.*	*Per cent.*		″ ″ ″ ″
9478	Eye beam 3731 V	.564	.250	8,500	34,000	16,420	65,680	.91	30.3	Diam .. .35=.096	61.6	Fine silky ..	.35*, .38*, .18
9479	Eye beam 3731, C 76...	.25	.049	1,810	36,940	2,995	61,120	.70	23.3	Diam .. .14=.015	69.4	.....do	.38*, .21, .11
9480	Eye beam 3731, 8 D....	.25	.049	1,730	35,310	2,992	61,060	.59	19.7	Diam .. .15=.018	63.3	.....do	.30*, .16, .13
9481	Bolt F-1238, 1″.54 diam	.905	.643	21,600	33,590	35,580	55,330	2.54	31.8	Diam .. .54=.229	64.4	.....do	.20, .29, .78*, .35, .28, .26, .24, .19
9482	Bolt E-1209, 1″.79 diam	.910	.650	23,100	35,540	44,260	68,090	2.24	28.0	Diam .. .60=.283	56.5	.....do	.16, .21, .23, .30, .66*, .28, .22, .18

PROOF STRESS APPLIED TO PISTON RODS FOR GUN CARRIAGES.

No of test.	Description.	Total length.	Diameters.			Tensile stress applied.
			Maximum.	Minimum.	Root of thread.	
		Inches.	*Inches.*	*Inches.*	*Inches.*	*Pounds.*
9337	8″ disappearing carriages.......	139.75	3½	3.00	....	90,000
9351	12″ disappearing carriages......	219.75	4.75	4.25	4.07	116,000
9516	10″ disappearing carriages......	179.45	3.50	3.00	2.83	125,000

HELICAL SPRINGS.

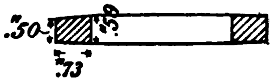
COMPRESSION OF HELICAL SPRINGS FOR 7-INCH MORTAR CARRIAGES. MODEL 1895.

Springs branded "A D & Co."

No. 9341.

SPRINGS FROM LOT OF 28.

Cross section.



No. of spring.	Weight.		Exterior diameter.	Diameter of wire.	Height unloaded.	Load when compressed to height of 6 inches.	Closed down.		Load when returned to height of 6 inches.
							Load.	Height.	
	Lbs.	*oz.*	*Inches.*	*Inches.*	*Inches.*	*Pounds.*	*Pounds.*	*Inches.*	*Pounds.*
[a]1	8	12¼	4.50	.54×.73	7.20	924	2,872	4.20	860
2	8	9¾	4.50	.54×.75	7.20	1,238	3,180	4.21	1,181
3	8	12	4.52	.54×.75	7.10	1,116	3,226	4.20	1,058
4	8	11½	4.51	.54×.75	7.10	1,100	3,178	4.22	1,023
5	8	9¾	4.50	.54×.75	7.05	1,077	2,240	4.20	1,038
6	8	12¼	4.50	.54×.75	7.05	1,058	3,084	4.22	977
7	8	13¼	4.50	.55×.75	7.15	1,196	3,215	4.27	1,140
8	8	12	4.50	.54×.75	7.05	1,083	3,005	4.26	996
9	8	10¼	4.50	54×.74	7.15	1,168	3,190	4.22	1,115
10	8	12	4.50	.54×.75	7.05	1,049	3,064	4.23	1,014

[a] Second loading of this spring.

The tenth spring was closed down and thus remained for a period of 17 hours.

Load sustained when returned to a height of 6 inches, 1,005 pounds.

Spring loaded 100 times, closing to a height of 4¼ inches and releasing between each loading to a height of 6 inches.

Final observations after repeated loading:

Height, 6 inches; load sustained, 966 pounds.

Height, 4¼ inches; load sustained, 2,942 pounds.

Height, 6 inches; load sustained, 966 pounds.

No. 9350.

SPRINGS FROM SECOND LOT OF 32.

No. of spring.	Weight.		Exterior diameter.	Diameter of wire.	Height unloaded.	Load when compressed to height of 6 inches.	Closed down.		Load when returned to height of 6 inches.
							Load.	Height.	
	Lbs.	*oz.*	*Inches.*	*Inches.*	*Inches.*	*Pounds.*	*Pounds.*	*Inches.*	*Pounds.*
1	8	9	4.48	.54×.75	7.20	1,193	3,250	4.13	1,034
2	8	7¾	4.50	.54×.75	7.15	1,156	3,220	4.15	1,029
3	8	10	4.50	.54×.75	7.13	1,104	3,490	4.14	946
4	8	8½	4.50	.54×.75	7.15	1,100	3,280	4.05	952
5	8	9¼	4.48	.54×.75	7.12	1,066	3,390	4.13	1,032
6	8	8¼	4.48	.54×.75	7.16	1,193	3,700	4.06	1,028
7	8	9¼	4.49	.54×.75	7.14	1,088	3,550	4.11	971
8	8	8¾	4.48	.54×.75	7.18	1,224	3,350	4.13	1,058
9	8	7	4.47	.54×.75	7.15	1,146	3,120	4.17	1,015
10	8	11½	4.48	.54×.75	7.02	1,017	2,960	4.28	974

The eighth spring was returned to the testing machine for repeated loading and for closing down for a period of time.

Spring loaded 16 times, closing to a height of 4¼ inches and releasing to 6 inches height.

The spring was then closed to 4¼ inches height and remained for a period of 15 hours. Returning to a height of 6 inches, the load sustained was 1,048 pounds.

Repeated loadings were then resumed until the total number reached 100.

Finally the spring gave the following results:

Height, 4¼ inches; load sustained, 2,916 pounds.

Height, 6 inches; load sustained, 998 pounds.

No. 9515.

SPRINGS FROM THIRD LOT OF 30.

No. of spring.	Weight.		Exterior diameter.	Diameter of wire.	Height unloaded.	Load when compressed to height of 6 inches.	Closed down.		Load when returned to height of 6 inches.
							Load.	Height.	
	Lbs.	*oz.*	*Inches.*	*Inches.*	*Inches.*	*Pounds.*	*Pounds.*	*Inches.*	*Pounds.*
1	8	11	4.55	.68×.74	7.08	1,638	4,500	4⅛	1.235
2	8	14½	4.50	.67×.74	7.05	1,562	4,400	4.21	1,248
3	9	½	4.53	.67×.75	7.05	1,684	4,800	4.18	1,372
4	8	15	4.50	.67×.74	7.06	1,637	4,600	4.19	1,244
5	8	15	4.52	.67×.74	7.05	1,542	4,300	4.22	1,200
6	8	15½	4.57	.67×.75	7.02	1,558	4,750	4⅛	1,246
7	8	11⅛	4.53	.67×.74	7.01	1.596	4,500	4.18	1,224
8	8	10	4.48	.67×.73	7.09	1,552	4,600	4⅛	1,230
9	8	14¼	4.50	.67×.73	7.02	1,540	4,450	4.24	1,257
10	8	13½	4.51	.67×.74	7.02	1,572	4,400	4.20	1,180

The tenth spring loaded 100 times, closed down to a height of 4¼ inches. and released to a height of 6 inches between each loading.

Load sustained at height of 6 inches, when series of loadings began, 1,466 pounds.

Load sustained when 4¼ inches high, 4,100 pounds.

Load sustained when 6 inches high, at end of series of 100 loadings, 1,100 pounds.

No. of test.	Weight.	Exterior diameter.	Diameter of wire.	Height unloaded.	Load when compressed to height of 6 inches.	Closed down.		Load when returned to height of 6 inches.
						Load.	Height.	
	Lbs. oz.	*Inches.*	*Inches.*	*Inches.*	*Pounds.*	*Pounds.*	*Inches.*	*Pounds.*
9441	7 2¾	4.27	.62 × .62	6.75	1,000	4,420	4⅛	830
Retest	....	....	....	....	962	3,780	4⅛	806

Compression of helical springs. Counter-recoil springs for barbette carriage, 5-inch rapid-fire gun, M. 96.

No. of test.	Dimensions.			Weight.		Load at height of 15.5 inches.	When closed down.	
	Height.	Exterior diameter.	Interior diameter.				Load.	Height.
	Inches.	*Inches.*	*Inches.*	*Lbs.*	*oz.*	*Pounds.*	*Pounds.*	*Inches.*
9369	19.85	4.40	3.04	19	2	1,831	3,900	11.05
9370	19.60	4.43	3.07	19	1¼	1,695	3,700	11.20
9371	19.97	4.40	3.04	19	3⅛	1,892	3,850	11.43
9372	19.78	4.40	3.04	19	1¼	1,822	3,780	11.11
9373	19.52	4.40	3.04	19	1	1,715	3,650	11.13
9424	19.99	4.35	2.99	19	2¾	1,816	3,550	11.20
9425	20.01	4.37	3.01	19	5⅛	1,986	3,780	11.29
9426	19.80	4.36	3.00	18	15¼	1,774	3,600	11.06
9427	19.92	4.34	2.96	19	1¾	1,846	3,700	11.17
9428	19.86	4.34	2.98	19	2⅛	1,860	3,850	11.09
9429	19.71	4.37	3.01	19	6¼	1,786	3,690	11.14
9430	19.89	4.35	2.97	19	2¼	1,810	3,750	11.16
9431	19.71	4.37	2.99	19	4	1,775	3,680	11.09
9432	19.85	4.38	3.00	18	15½	1,762	3,650	10.93
9433	19.83	4.36	2.98	18	15½	1,770	3,750	11.08
9434	19.88	4.36	2.98	19	0	1,790	3,800	11.18
9435	19.83	4.34	2.96	18	13⅛	1,756	3,600	11.04
9436	19.89	4.35	2.97	19	⅛	1,830	3,700	11.13
9437	19.84	4.35	2.97	19	4	1,815	3,950	11.04
9438	19.90	4.35	2.99	19	1¾	1,890	3,800	11.05
9439	20.02	4.35	2.99	18	15¾	1,894	3,800	11.07
9440	19.85	4.38	3.00	19	4½	1,850	3,750	11.20

INTERNAL STRAINS

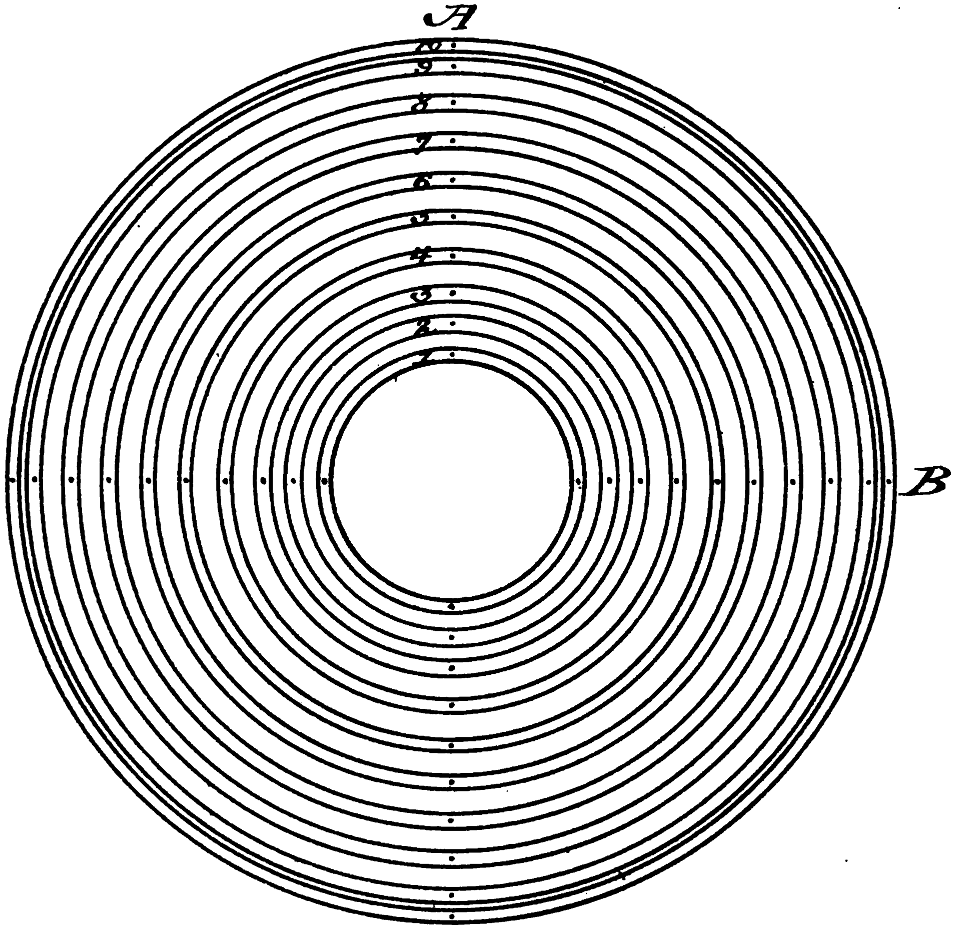
IN

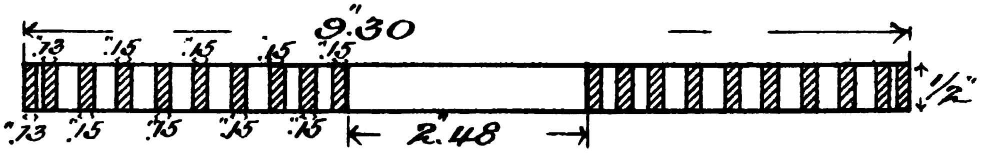
3-INCH SINGLE FORGING GUN.

FORGING HEATED, AND QUENCHED FROM THE BORE.

3-inch Single Forging Gun

Breech Slice.



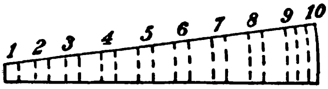


BREECH SLICE.

State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

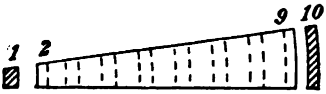
Interior diameter, 2″.48. Exterior diameter, 9″.30.



Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	2.6235		.00295		33,730
2	3.26975		.0026		23,850
3	3.94465		.0001		760
4	4.7489	.0007		4,420	
5	5.54565	.0014		7,570	
6	6.3302	.0019		9,000	
7	7.14045	.00235		9,870	
8	7.94415	.0026		9,820	
9	8.7371	.00205		7,040	
10	9.1650	.00125		4,090	

Rings 1 and 10 detached. Rings 2 to 9 in the slice.
Interior diameter of slice, 3″.12. Exterior diameter, 8″.86.

B



Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	2.62645				
2	3.26875		.0036		33,030
3	3.94385		.0009		6,840
4	4.74305		.00015		950
5	5.5449	.00065		3,510	
6	6.3298	.0015		7,110	
7	7.1399	.0018		7,560	
8	7.9435	.00195		7,360	
9	8.73665	.0016		5,490	
10 detached	9.16375				

RINGS ALL DETACHED.

C"

2 detached	3.27235				
3 detached	3.94475				
4 detached	4.7432				
5 detached	5.54425				
6 detached	6.8283				
7 detached	7.1381				
8 detached	7.94155				
9 detached	8.73505				

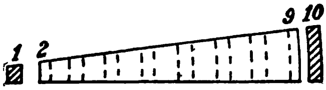
BREECH SLICE.

Interior diameter, 2″.48. Exterior diameter, 9″.30.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	2.6244	2.6226	2.6235
2	3.2695	3.2700	3.26975
3	3.9453	3.9440	3.94465
4	4.7428	4.7450	4.7439
5	5.5469	5.5444	5.54565
6	6.3247	6.3357	6.3302
7	7.1400	7.1409	7.14045
8	7.9434	7.9449	7.94415
9	8.7362	8.7380	8.7371
10	9.1665	9.1685	9.1650

BREECH SLICE.

Total strains released as the rings were successively detached.
Rings 1 and 10 detached; rings 2 to 9 in the slice.
Interior diameter of slice, 3″.12. Exterior diameter, 8″.86.



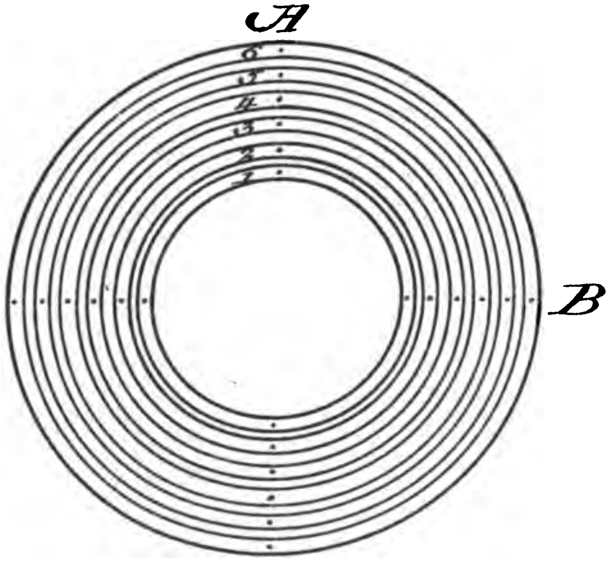
Rings.	Present diameters.		Strains released.		
			Diameters.		Mean.
	A.	B.	A.	B.	
	Inches.	*Inches.*	*Inch.*	*Inch.*	*Inch.*
1 detached	2.6273	2.6256	+.0029	+.0030	+.00295
2	3.2685	3.2690	−.0010	−.0010	−.0010
3	3.9445	3.9432	−.0008	−.0008	−.0008
4	4.7419	4.7442	−.0009	−.0008	−.00085
5	5.5462	5.5436	−.0007	−.0008	−.00075
6	6.3244	6.3352	−.0003	−.0005	−.0004
7	7.1395	7.1403	−.0005	−.0006	−.00055
8	7.9427	7.9443	−.0007	−.0006	−.00065
9	8.7358	8.7875	−.0004	−.0005	−.00045
10 detached	9.1650	9.1625	−.0015	−.0010	−.00125

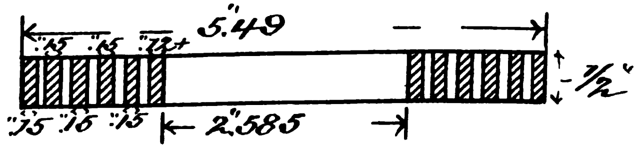
RINGS ALL DETACHED.

2 detached	3.2721	3.2726	+.0026	+.0026	+.0026
3 detached	3.9454	3.9441	+.0001	+.0001	+.0001
4 detached	4.7420	4.7444	−.0008	−.0006	−.0007
5 detached	5.5455	5.5430	−.0014	−.0014	−.0014
6 detached	6.3230	6.3336	−.0017	−.0021	−.0019
7 detached	7.1374	7.1388	−.0026	−.0021	−.00235
8 detached	7.9407	7.9424	−.0027	−.0025	−.0026
9 detached	8.7336	8.7365	−.0026	−.0015	−.00205

3-inch Single Forging Gun

Muzzle Slice.



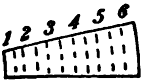


MUZZLE SLICE.

State of internal strains and stresses at different phases of the slice.

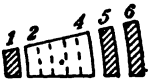
SLICE INTACT.

Interior diameter, 2″.585; exterior diameter, 5″.40.



Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1	2.71445		.00265		29,290
2	3.1464		.0009		8,580
3	3.69785	.00015		1,220	
4	4.2470	.0009		6,360	
5	4.78615	.0017		10,650	
6	5.8352	.00055		3,090	

Rings 1, 5, and 6 detached; rings 2, 3, and 4 in the slice.
Interior diameter of slice, 3″.00. Exterior diameter, 4″.40.



Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
1 detached	2.7171				
2	3.14615		.00115		10,960
3	3.6977	0.	0.	0	0
4	4.24715	.00105		7,040	
5 detached	4.78445				
6 detached	5.33465				

RINGS ALL DETACHED.

2 detached	3.1473				
3 detached	3.6977				
4 detached	4.2461				

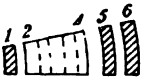
MUZZLE SLICE.

Interior diameter, 2''.585. Exterior diameter, 5''.49.
Original diameters of rings in the slice.

Rings.	Diameters.		
	A.	B.	Mean.
	Inches.	*Inches.*	*Inches.*
1	2.7143	2.7146	2.71445
2	3.1437	3.1491	3.1464
3	3.6969	3.6988	3.69785
4	4.2496	4.2444	4.2470
5	4.7846	4.7877	4.78615
6	5.3392	5.3312	5.3352

MUZZLE SLICE.

Total strains released as the rings were successively detached.
Rings 1, 5, and 6 detached; rings 2, 3, and 4 in the slice.



Rings.	Present diameters.		Strains released.		
			Diameters.		Mean.
	A.	B.	A.	B.	
	Inches.	*Inches.*	*Inch.*	*Inch.*	*Inch.*
1 detached	2.7171	2.7171	+.0028	+.0025	+.00265
2	3.1435	3.1488	—.0002	—.0003	—.00025
3	3.6968	3.6986	—.0001	—.0002	—.00015
4	4.2498	4.2445	+.0002	+.0001	+.00015
5 detached	4.7830	4.7859	—.0016	—.0018	—.0017
6 detached	5.3369	5.3324	—.0023	+.0012	—.00055

RINGS ALL DETACHED.

2 detached	3.1444	3.1502	+.0007	+.0011	+.0009
3 detached	3.6968	3.6986	—.0001	—.0002	—.00015
4 detached	4.2487	4.2435	—.0009	—.0009	—.0009

INTERNAL STRAINS

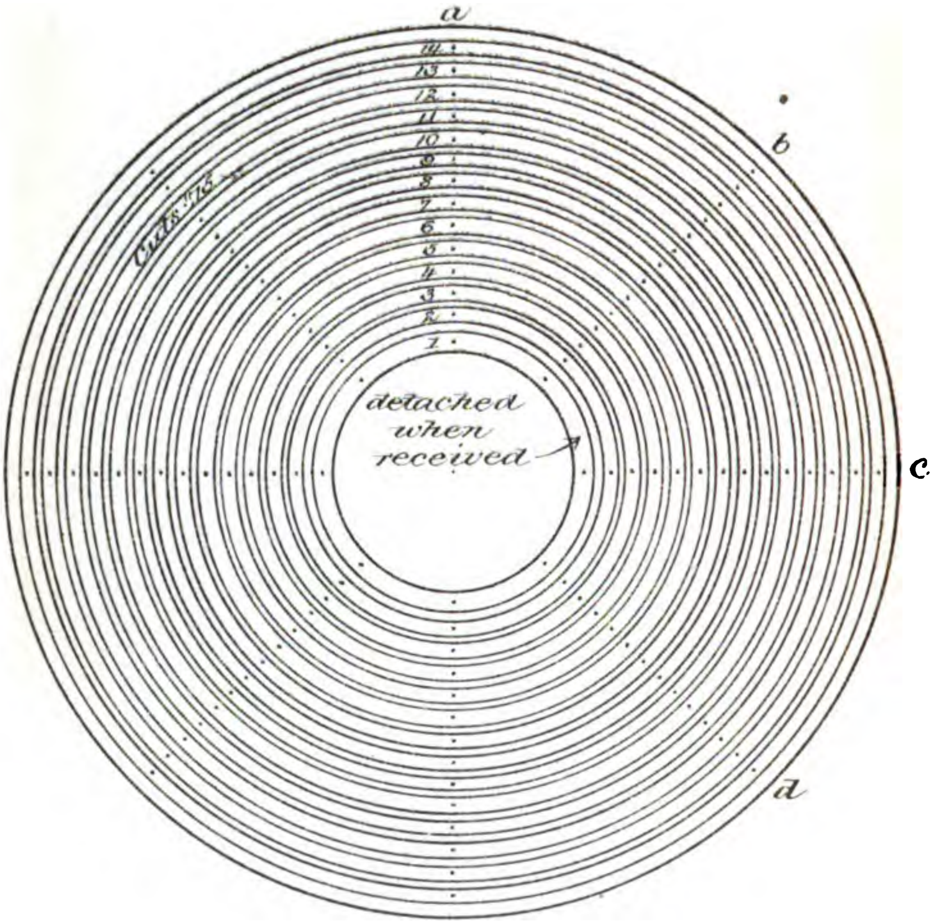
IN

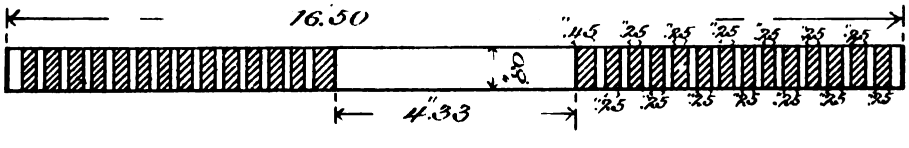
5-INCH SINGLE FORGING RAPID-FIRE GUN.

FORGING HEATED, AND QUENCHED FROM THE BORE.

Breech Slice.

Taken off after first treatment.



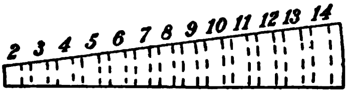


BREECH SLICE.

Taken off after first treatment.
State of internal strains and stresses at different phases of the slice.

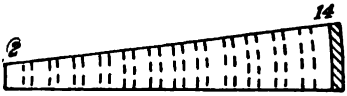
SLICE INTACT.

Interior diameter, 5″.55. Exterior diameter, 16″.50.
Ring 1 taken out and measured at South Bethlehem.



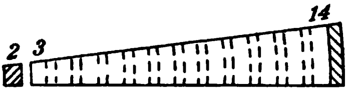
Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
2	5.805825		.005275		27,300
3	6.623775		.003775		17,100
4	7.465950		.002925		11,700
5	8.270575		.001875		6,800
6	9.102550		.000775		2,500
7	9.9146		.000225		700
8	10.708150	.001175		3,300	
9	11.556225	.0017		4,400	
10	12.3902	.003075		7,400	
11	13.190850	.002875		6,500	
12	14.024950	.003275		7,000	
13	14.8461	.0035		7,100	
14	15.716575	.0031		5,900	

Metal beyond ring 14 turned off, rings 2 to 14 in the slice.
Interior diameter of slice, 5″.55. Exterior diameter, 16″.05.



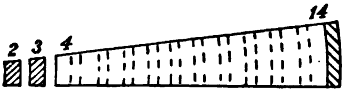
Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
2	5.806175		.004925		25,400
3	6.623950		.0036		16,800
4	7.4659		.002975		12,000
5	8.270275		.002175		7,900
6	9.102375		.000950		3,100
7	9.914475		.000350		1,100
8	10.708175	.0012		3,400	
9	11.556325	.0018		4,700	
10					
11					
12	14.0249	.003225		6,900	
13					
14	15.716075	.0035		6,700	

Ring 2 detached, rings 3 to 14 in the slice.
Interior diameter of slice, 6″.38. Exterior diameter, 16″.05.



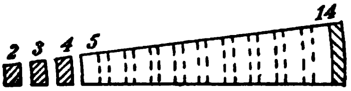
Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
2 detached	5.8111				
3	6.6227		.004850		22,000
4	7.4652		.003675		14,800
5	8.269875		.002575		9,800
6	9.101775		.001550		5,100
7	9.9144		.000425		1,300
8	10.707675	.0007		2,000	
9	11.555925	.0014		3,600	
10	12.389775	.002650		6,400	
11	13.1906	.002625		6,000	
12	14.024450	.002775		5,900	
13	14.845850	.003250		6,600	
14	15.716350	.002875		5,500	

Rings 2 and 3 detached; rings 4 to 14 in the slice.
Interior diameter of slice, 7″.18. Exterior diameter, 16″.05.



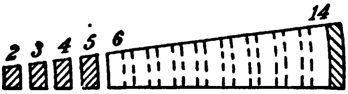
Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
3 detached	6.627550				
4	7.464050		.004825		19,400
5	8.269075		.003375		12,200
6	9.100950		.002375		7,800
7	9.9135		.001325		4,000
8	10.706975	0.	0.	0.	0.
9	11.555350	.000825		2,100	
10	12.389375	.002250		5,400	
11	13.190150	.002175		4,900	
12	14.024050	.002375		5,100	
13	14.845450	.002850		5,800	
14	15.7159	.002425		4,600	

Rings 2, 3, and 4 detached; rings 5 to 14 in the slice.
Interior diameter of slice, 8″.02. Exterior diameter, 16″.05.



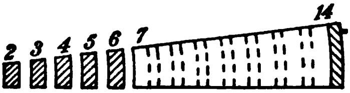
Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
4 detached	7.468875				
5	8.267875		.004575		16,600
6	9.100250		.003075		10,100
7	9.912850		.001975		6,000
8	10.706125		.000850		2,400
9	11.554575	.000050		100	
10	12.3885	.001375		3,300	
11	13.189425	.001450		3,300	
12	14.0236	.001925		4,100	
13	14.844750	.002150		4,300	
14	15.715175	.0017		3,200	

Rings 2 to 5 detached; rings 6 to 14 in the slice.
Interior diameter of slice, 8″.82. Exterior diameter, 16″.05.



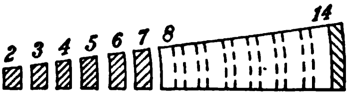
Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
5 detached	8.272450				
6	9.0994		.003925		12,900
7	9.9118		.003025		9,100
8	10.7055		.001475		4,100
9	11.5540		.000525		1,400
10	12.337775	.000650		1,600	
11	13.188450	.000475		1,100	
12	14.022850	.001175		2,500	
13	14.8441	.0015		3,000	
14	15.714550	.001075		2,100	

Rings 2 to 6 detatched; rings 7 to 14 in the slice.
Interior diameter of slice, 9''.65. Exterior diameter, 16''.05.



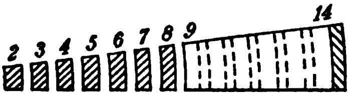
Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
6 detached	9.103325				
7	9.911350		.003475		10,500
8	10.7048		.002175		6,100
9	11.553250		.001275		3,300
10	12.387250	.000125		300	
11	13.188025	.000050		100	
12	14.022250	.000575		1,200	
13	14.843725	.001125		2,300	
14	15.714150	.000675		1,300	

Rings 2 to 7 detached; rings 8 to 14 in the slice.
Interior diameter of slice, 10''.48. Exterior diameter, 16''.05.



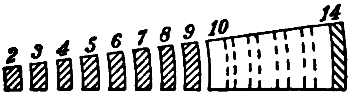
Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
7, detached	9.914825				
8	10.704175		.0028		7,800
9	11.552675		.001850		4,800
10	12.386625		.0005		1,200
11	13.187450		.000525		1,200
12	14.021725	.000050		100	
13	14.842950	.000350		700	
14	15.713575	.0001		200	

Rings 2 to 8 detached, rings 9 to 14 in the slice.
Interior diameter of slice, 11″.28. Exterior diameter, 16″.05.



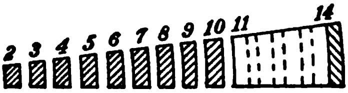
Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
8 detached	10.706975	....	....	....	....
9	11.5522	....	.002325	....	6,000
10	12.386350	....	.000775	....	1,900
11	13.1870	....	.000975	....	2,200
12	14.021150	....	.000525	....	1,100
13	14.8426	0.	0.	0.	0.
14	15.713150	....	.000325	....	600

Rings 2 to 9 detached, rings 10 to 14 in the slice.
Interior diameter of slice, 12″.08. Exterior diameter, 16″.05.



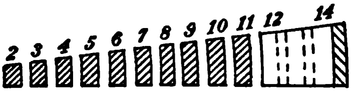
Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
9 detached	11.554525	....	....	....	....
10	12.386050	....	.001075	....	2,600
11	13.186725	....	.001250	....	2,800
12	14.0211	....	.000575	....	1,200
13	14.8424	....	.0002	....	400
14	15.712950	....	.000525	....	1,000

Rings 2 to 10 detached, rings 11 to 14 in the slice.
Interior diameter of slice, 12″.93. Exterior diameter, 16″.05.



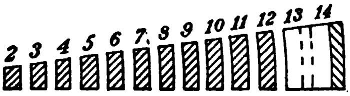
Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
10 detached	12.387125	....	....	....	....
11	13.186650	....	.001825	....	3,000
12	14.0212	....	.000475	....	1,000
13	14.842575	....	.000025	....	50
14	15.713050	....	.000425	....	800

Rings 2 to 11 detached, rings 12 to 14 in the slice.
Interior diameter of slice, 13″.68. Exterior diameter, 16″.05.



Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
11 detached	13.187975				
12	14.0210		.000675		1,400
13	14.842350		.000250		500
14	15.713050		.000425		800

Rings 2 to 12 detached, rings 13 and 14 in the slice.
Interior diameter of slice, 14″.55. Exterior diameter, 16″.05.



Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
12 detached	14.021675				
13	14.842425		.000175		400
14	15.713125		.000350		700

RINGS ALL DETACHED.

13	14.8426				
14	15.713475				

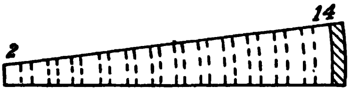
BREECH SLICE.

Taken off after first treatment.
Rings 2 to 14, and exterior metal beyond ring 14 in the slice.
Interior diameter, 5″.55. Exterior diameter, 16″.50.
Original diameters of rings in the slice.
Ring 1 taken out and measured at South Bethlehem.

Rings.	Diameters.				
	a.	b.	c.	d.	Mean.
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inches.*
2	5.8078	5.8094	5.8045	5.8016	5.805825
3	6.6291	6.6186	6.6194	6.6280	6.623775
4	7.4723	7.4590	7.4592	7.4733	7.465950
5	8.2722	8.2624	8.2703	8.2774	8.270575
6	9.1075	9.0985	9.0989	9.1053	9.102550
7	9.9.22	9.9176	9.9145	9.9141	9.9146
8	10.7053	10.7038	10.7083	10.7152	10.708150
9	11.5605	11.5518	11.5546	11.5580	11.556225
10	12.3934	12.3854	12.3849	12.3971	12.3902
11	13.1926	13.1856	13.1943	13.1909	13.190850
12	14.0211	14.0250	14.0222	14.0315	14.024950
13	14.8540	14.8405	14.8466	14.8433	14.8461
14	15.7164	15.7149	15.7230	15.7120	15.716575

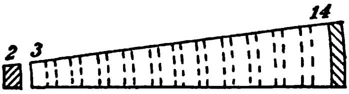
BREECH SLICE.

Taken off after first treatment.
Total strains released as the rings were successively detached.
Metal beyond ring 14 turned off; rings 2 to 14 in the slice.
Interior diameter of slice, 5″.55. Exterior diameter, 16″.05.



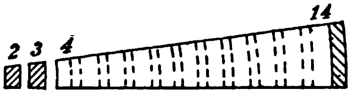
Rings.	Present diameters.				Strains released.				
					Diameters.				Mean.
	a.	b.	c.	d.	a.	b.	c.	d.	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
2	5.8080	5.8099	5.8048	5.8020	+.0002	+.0005	+.0003	+.0004	+.000350
3	6.6293	6.6188	6.6196	6.6281	+.0002	+.0002	+.0002	+.0001	+.000175
4	7.4722	7.4590	7.4590	7.4734	—.0001	.0000	—.0002	+.0001	—.000050
5	8.2719	8.2622	8.2700	8.2770	—.0003	—.0002	—.0003	—.0004	—.0003
6	9.1072	9.0985	9.0987	9.1051	—.0003	.0000	—.0002	—.0002	—.000175
7	9.9120	9.9177	9.9142	9.9140	—.0002	+.0001	—.0003	—.0001	—.000125
8	10.7053	10.7037	10.7082	10.7155	.0000	—.0001	—.0001	+.0003	+.000025
9	11.5607	11.5518	11.5546	11.5582	+.0002	.0000	.0000	+.0002	+.0001
10	....	....	....	....	....	....	....	....	....
11	....	....	....	....	....	....	....	....	....
12	14.0208	14.0246	14.0227	14.0315	—.0003	—.0004	+.0005	.0000	—.000050
13	....	....	....	....	....	....	....	....	....
14	15.7166	15.7152	15.7234	15.7127	+.0002	—.0003	+.0004	+.0007	+.000250

Ring 2 detached; rings 3 to 14 in the slice.
Interior diameter of slice, 6″.38. Exterior diameter, 16″.05.



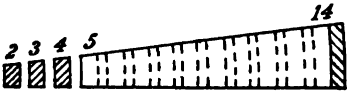
Rings.	Present diameters.				Strains released.				
					Diameters.				Mean.
	a.	b.	c.	d.	a.	b.	c.	d.	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
2 detached	5.8124	5.8154	5.8103	5.8063	+.0046	+.0060	+.0058	+.0047	+.005275
3..........	6.6280	6.6176	6.6182	6.6270	—.0011	—.0010	—.0012	—.0010	—.001075
4..........	7.4716	7.4583	7.4583	7.4726	—.0007	—.0007	—.0009	—.0007	—.000750
5..........	8.2715	8.2617	8.2695	8.2768	—.0007	—.0007	—.0008	—.0006	—.0007
6..........	9.1067	9.0979	9.0980	9.1045	—.0008	—.0006	—.0009	—.0008	—.000775
7..........	9.9117	9.9177	9.9145	9.9.37	—.0005	+.0001	.0000	—.0004	—.0002
8..........	10.7046	10.7031	10.7080	10.7150	—.0007	—.0007	—.0003	—.0002	—.000475
9..........	11.5601	11.5514	11.5542	11.5580	—.0004	—.0004	—.0004	.0000	—.0003
10..........	12.3929	12.3850	12.3846	12.3966	—.0005	—.0004	—.0003	—.0005	—.000425
11..........	13.1924	13.1851	13.1942	13.1907	—.0002	—.0005	—.0001	—.0002	—.000250
12..........	14.0204	14.0244	14.0219	14.0311	—.0007	—.0006	—.0003	—.0004	—.0005
13..........	14.8539	14.8400	14.8465	14.8430	—.0001	—.0005	—.0001	—.0003	—.000250
14..........	15.7157	15.7146	15.7230	15.7121	—.0007	—.0003	.0000	+.0001	—.000225

Rings 2 and 3 detached; rings 4 to 14 in the slice.
Interior diameter of slice, 7″.18. Exterior diameter, 16″.05.



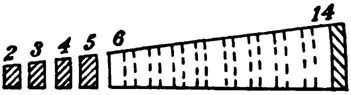
Rings.	Present diameters.				Strains released.				
					Diameters.				Mean.
	a.	b.	c.	d.	a.	b.	c.	d.	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
3 detached	6.6329	6.6214	6.6227	6.6332	+.0038	+.0028	+.0033	+.0052	+.003775
4..........	7.4702	7.4571	7.4573	7.4716	—.0021	—.0019	—.0019	—.0017	—.0019
5..........	8.2705	8.2610	8.2688	8.2760	—.0017	—.0014	—.0015	—.0014	—.0015
6..........	9.1057	9.0970	9.0974	9.1037	—.0018	—.0015	—.0015	—.0016	—.0016
7..........	9.9108	9.9166	9.9138	9.9128	—.0014	—.0010	—.0007	—.0013	—.0011
8..........	10.7040	10.7026	10.7070	10.7143	—.0013	—.0012	—.0013	—.0009	—.001175
9..........	11.5595	11.5508	11.5539	11.5572	—.0010	—.0010	—.0007	—.0008	—.000875
10..........	12.3925	12.3846	12.3843	12.3961	—.0009	—.0008	—.0006	—.0010	—.000825
11..........	13.1920	13.1848	13.1939	13.1899	—.0006	—.0008	—.0004	—.0010	—.0007
12..........	14.0198	14.0241	14.0216	14.0307	—.0013	—.0009	—.0006	—.0008	—.0009
13..........	14.8535	14.8398	14.8461	14.8424	—.0005	—.0007	—.0005	—.0009	—.000650
14..........	15.7154	15.7143	15.7224	15.7115	—.0010	—.0006	—.0006	—.0005	—.000675

Rings 2, 3, and 4 detached; rings 5 to 14 in the slice.
Interior diameter of slice, 8″.02. Exterior diameter, 16″.05.



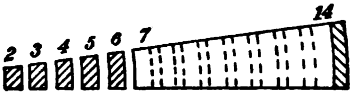
Rings.	Present diameters.				Strains released.				
					Diameters.				Mean.
	a.	b.	c.	d.	a.	b.	c.	d.	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
4 detached	7.4754	7.4623	7.4618	7.4760	+.0031	+.0033	+.0026	+.0027	+.002925
5..........	8.2691	8.2599	8.2676	8.2749	—.0031	—.0025	—.0027	—.0025	—.0027
6..........	9.1051	9.0962	9.0967	9.1030	—.0024	—.0023	—.0022	—.0023	—.0023
7..........	9.9101	9.9161	9.9131	9.9121	—.0021	—.0015	—.0014	—.0020	—.001750
8..........	10.7031	10.7017	10.7066	10.7131	—.0022	—.0021	—.0017	—.0021	—.002025
9..........	11.5587	11.5500	11.5531	11.5565	—.0018	—.0018	—.0015	—.0015	—.001650
10..........	12.3915	12.3837	12.3834	12.3954	—.0019	—.0017	—.0015	—.0017	—.0017
11..........	13.1911	13.1841	13.1932	13.1893	—.0015	—.0015	—.0011	—.0016	—.001425
12..........	14.0195	14.0236	14.0211	14.0302	—.0016	—.0014	—.0011	—.0013	—.001350
13..........	14.8527	14.8389	14.8455	14.8419	—.0013	—.0016	—.0011	—.0014	—.001350
14..........	15.7146	15.7136	15.7217	15.7108	—.0018	—.0013	—.0013	—.0012	—.0014

Rings 2 to 5 detached; rings 6 to 14 in the slice.
Interior diameter of slice, 8″.82. Exterior diameter, 16″.05.



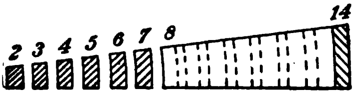
Rings.	Present diameters.				Strains released.				
					Diameters.				Mean.
	a.	b.	c.	d.	a.	b.	c.	d.	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
5 detached	8.2744	8.2623	8.2725	8.2806	+.0022	—.0001	+.0022	+.0032	+.001875
6..........	9.1041	9.0051	9.0958	9.1023	—.0034	—.0031	—.0031	—.0030	—.003150
7..........	9.9090	9.9149	9.9120	9.9113	—.0032	—.0027	—.0025	—.0028	—.0028
8..........	10.7026	10.7011	10.7057	10.7126	—.0027	—.0027	—.0026	—.0028	—.002650
9..........	11.5581	11.5495	11.5525	11.5559	—.0024	—.0023	—.0021	—.0021	—.002225
10..........	12.3909	12.3830	12.3826	12.3946	—.0025	—.0024	—.0023	—.0025	—.002425
11..........	13.1902	13.1831	13.1922	13.1883	—.0024	—.0025	—.0021	—.0026	—.0024
12..........	14.0187	14.0230	14.0205	14 0292	—.0024	—.0020	—.0017	—.0023	—.0021
13..........	14.8521	14.8383	14.8448	14.8412	—.0019	—.0022	—.0018	—.0021	—.0020
14..........	15.7139	15.7130	15.7212	15.7101	—.0025	—.0019	—.0018	—.0019	—.002025

Rings 2 to 6 detached; rings 7 to 14 in the slice.
Interior diameter of slice, 9″.65. Exterior diameter, 16″.05.



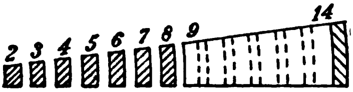
Rings.	Present diameters.				Strains released.				
					Diameters.				Mean.
	a	b	c	d	a	b	c	d	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
6 detached	9.1081	9.1002	9.0995	9.1055	+.0006	+.0017	+.0006	+.0002	+.000775
7..........	9.9084	9.9145	9.9116	9.9109	—.0038	—.0031	—.0029	—.0032	—.003250
8..........	10.7016	10.7005	10.7050	10.7121	—.0037	—.0033	—.0033	—.0031	—.003350
9..........	11.5573	11.5488	11.5519	11.5550	—.0032	—.0030	—.0027	—.0030	—.002975
10..........	12.3902	12.3824	12.3821	12.3943	—.0032	—.0030	—.0028	—.0028	—.002950
11..........	13.1896	13.1826	13.1918	13.1881	—.0030	—.0030	—.0025	—.0028	—.002850
12..........	14.0181	14.0224	14.0198	14.0287	—.0030	—.0026	—.0024	—.0028	—.0027
13..........	14.8516	14.8380	14.8444	14.8409	—.0024	—.0025	—.0022	—.0024	—.002375
14..........	15.7135	15.7126	15.7207	15.7098	—.0029	—.0023	—.0023	—.0022	—.002425

Rings 2 to 7 detached; rings 8 to 14 in the slice.
Interior diameter of slice, 10″.48. Exterior diameter, 16″.05.



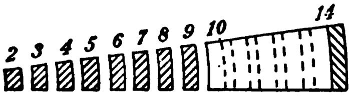
Rings.	Present diameters.				Strains released.				
					Diameters.				Mean.
	a	b	c	d	a	b	c	d	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
7 detached	9.9121	9.9181	9.9150	9.9141	—.0001	+.0005	+.0005	.0000	+.000225
8..........	10.7011	10.6998	10.7044	10.7114	—.0042	—.0040	—.0039	—.0038	—.003975
9..........	11.5568	11.5482	11.5511	11.5546	—.0037	—.0036	—.0035	—.0034	—.003550
10..........	12.3897	12.3819	12.3814	12.3935	—.0037	—.0035	—.0035	—.0036	—.003575
11..........	13.1892	13.1820	13.1911	13.1875	—.0034	—.0036	—.0032	—.0034	—.0034
12..........	14.0176	14.0217	14.0193	14.0283	—.0035	—.0033	—.0029	—.0032	—.003225
13..........	14.8510	14.8370	14.8437	14.8401	—.0030	—.0035	—.0029	—.0032	—.003150
14..........	15.7131	15.7119	15.7201	15.7092	—.0033	—.0030	—.0029	—.0028	—.0030

Rings 2 to 8 detached; rings 9 to 14 in the slice.
Interior diameter of slice, 11″.28. Exterior diameter, 16″.05.



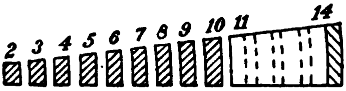
Rings.	Present diameters.				Strains released.				
					Diameters.				Mean.
	a	*b*	*c*	*d*	*a*	*b*	*c*	*d*	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
8 detached	10.7036	10.7026	10.7076	10.7141	—.0017	—.0012	—.0007	—.0011	—.001175
9..........	11.5565	11.5476	11.5504	11.5543	—.0040	—.0042	—.0042	—.0037	—.004025
10..........	12.3895	12.3815	12.3810	12.3934	—.0039	—.0039	—.0039	—.0037	—.003850
11..........	13.1888	13.1815	13.1905	13.1872	—.0038	—.0041	—.0038	—.0037	—.003850
12..........	14.0171	14.0211	14.0188	14.0276	—.0040	—.0039	—.0034	—.0039	—.0038
13..........	14.8507	14.8367	14.8432	14.8398	—.0033	—.0038	—.0034	—.0035	—.0035
14..........	15.7127	15.7115	15.7196	15.7088	—.0037	—.0034	—.0034	—.0032	—.003425

Rings 2 to 9 detached; rings 10 to 14 in the slice.
Interior diameter of slice, 12″.08. Exterior diameter, 16″.05.



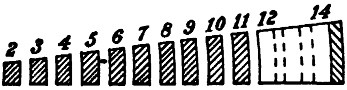
Rings.	Present diameters.				Strains released.				
					Diameters.				Mean.
	a	*b*	*c*	*d*	*a*	*b*	*c*	*d*	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inch*	*Inch.*	*Inch.*
9 detached	11.5587	11.5499	11.5540	11.5555	—.0018	—.0019	—.0006	—.0025	—.0017
10..........	12.3891	12.3809	12.3809	12.3933	—.0043	—.0045	—.0040	—.0038	—.004150
11..........	13.1885	13.1810	13.1904	13.1870	—.0041	—.0046	—.0039	—.0039	—.004125
12..........	14.0170	14.0207	14.0186	14.0281	—.0041	—.0043	—.0036	—.0034	—.0038
13..........	14.8505	14.8363	14.8431	14.8397	—.0035	—.0042	—.0035	—.0036	—.0037
14..........	15.7125	15.7110	15.7198	15.7090	—.0039	—.0039	—.0037	—.0030	—.003625

Rings 2 to 10 detached; rings 11 to 14 in the slice.
Interior diameter of slice, 12″.93. Exterior diameter, 16″.05.



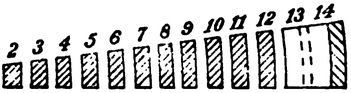
Rings.	Present diameters.				Strains released.				
					Diameters.				Mean.
	a	b	c	d	a	b	c	d	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
10 detached	12. 3904	12. 3828	12. 3815	12. 3938	—. 0030	—. 0026	—. 0034	—. 0033	—. 003075
11..........	13. 1882	13. 1806	13. 1907	13. 1871	—. 0044	—. 0050	—. 0036	—. 0038	—. 0042
12..........	14. 0170	14. 0204	14. 0191	14. 0283	—. 0041	—. 0046	—. 0031	—. 0032	—. 003750
13..........	14. 8503	14. 8362	14. 8435	14. 8403	—. 0037	—. 0043	—. 0031	—. 0030	—. 003525
14..........	15. 7124	15. 7106	15. 7198	15. 7094	—. 0040	—. 0043	—. 0032	—. 0026	—. 003525

Rings 2 to 11 detached; rings 12 to 14 in the slice.
Interior diameter of slice, 13″.68. Exterior diameter, 16″.05.



Rings.	Present diameters.				Strains released.				
					Diameters.				Mean.
	a	b	c	d	a	b	c	d	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
11 detached	13. 1903	13. 1825	13. 1903	13. 1888	—. 0023	—. 0031	—. 0040	—. 0021	—. 002875
12..........	14. 0167	14. 0209	14. 0186	14. 0278	—. 0044	—. 0041	—. 0036	—. 0037	—. 003950
13..........	14. 8502	14. 8363	14. 8431	14. 8398	—. 0038	—. 0042	—. 0035	—. 0035	—. 003750
14..........	15. 7124	15. 7112	15. 7196	15. 7090	—. 0040	—. 0037	—. 0034	—. 0030	—. 003525

Rings 2 to 12 detached; rings 13 and 14 in the slice.
Interior diameter of slice, 14″.55. Exterior diameter, 16″.05.



Rings.	Present diameters.				Strains released.				
					Diameters.				Mean.
	a	b	c	d	a	b	c	d	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
12 detached	44.0175	14.0215	14.0193	14.0284	—.0036	—.0035	—.0029	—.0031	—.003275
13..........	14.8502	14.8365	14.8431	14.8309	—.0038	—.0040	—.0035	—.0034	—.003675
14..........	15.7125	15.7111	15.7196	15.7093	—.0039	—.0038	—.0034	—.0027	—.003450

RINGS ALL DETACHED.

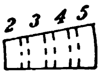
13 detached	14.8504	14.8359	14.8432	14.8409	—.0036	—.0046	—.0034	—.0024	—.0035
14 detached	15.7134	15.7133	15.7191	15.7081	—.0030	—.0016	—.0939	—.0039	—.0031

MUZZLE SLICE.

Taken off after first treatment.
State of internal strains and stresses at different phases of the slice.

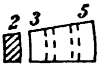
SLICE INTACT.

Interior diameter, 5″.00. Exterior diameter, 8″.00.
Ring 1 taken out and measured at South Bethlehem.



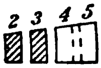
Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
2..........................	5.257350	....	.002475	....	14,100
3..........................	6.062650	.0001	....	500	....
4..........................	6.885450	.000625	....	2,700	....
5..........................	7.738875	.001650	....	6,400	....

Ring 2 detached; rings 3, 4, and 5 in the slice.
Interior diameter, 5″.82. Exterior diameter, 8″.00.



Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
2 detached	5.259825				
3	6.061625		.000925		4,600
4	6.884775		.000050		200
5	7.738425	.0012		4,700	

Rings 2 and 3 detached; rings 4 and 5 in the slice.
Interior diameter, 6″.66. Exterior diameter, 8″.00.



Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
3 detached	6.062550				
4	6.883975		.000850		3,700
5	7.737650	.000425		1,600	

RINGS ALL DETACHED.

4 detached	6.884825				
5 detached	7.737225				

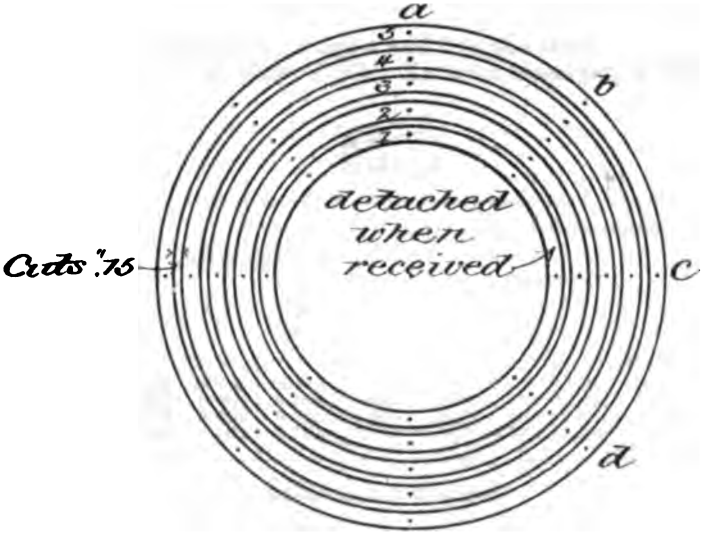
MUZZLE SLICE.

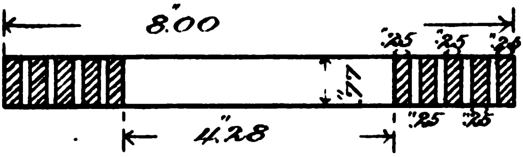
Taken off after first treatment.
Interior diameter, 5″.00. Exterior diameter, 8″.00.
Original diameters of rings in the slice.
Ring 1 taken out and measured at South Bethlehem.

Rings.	Diameters.				
	a	*b*	*c*	*d*	Mean.
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inches.*
2	5.2560	5.2611	5.2571	5.2552	5.257350
3	6.0636	6.0679	6.0626	6.0565	6.062650
4	6.8885	6.8856	6.8826	6.8851	6.885450
5	7.7361	7.7464	7.7369	7.7361	7.738875

Muzzle Slice.

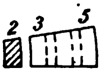
Taken off after first treatment.





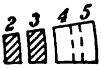
MUZZLE SLICE.

Taken off after first treatment.
Total strains released as the rings were successively detached.
Ring 2 detached; rings 3, 4, and 5 in the slice.
Interior diameter, 5''.82. Exterior diameter, 8''.00.



Rings.	Present diameters.				Strains released.				
					Diameters.				Mean.
	a	*b*	*c*	*d*	*a*	*b*	*c*	*d*	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
2 detached.	5.2580	5.2638	5.2600	5.2575	+.0020	+.0027	+.0029	+.0023	+.002475
3...........	6.0626	6.0666	6.0617	6.0556	—.0010	—.0013	—.0009	—.0009	—.001025
4...........	6.8880	6.8847	6.8819	6.8845	—.0005	—.0009	—.0007	—.0006	—.000675
5...........	7.7357	7.7456	7.7365	7.7359	—.0004	—.0008	—.0004	—.0002	—.000450

Rings 2 and 3 detached; rings 4 and 5 in the slice.
Interior diameter of slice, 6''.65. Exterior diameter, 8''.00.



Rings.	Present diameters.				Strains released.				
					Diameters.				Mean.
	a	*b*	*c*	*d*	*a*	*b*	*c*	*d*	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
3 detached.	6.0636	6.0675	6.0626	6.0565	.0000	—.0004	.0000	.0000	—.0001
4...........	6.8872	6.8840	6.8812	6.8835	—.0013	—.0016	—.0014	—.0016	—.001475
5...........	7.7349	7.7451	7.7356	7.7350	—.0012	—.0013	—.0013	—.0011	—.001225

RINGS ALL DETACHED.

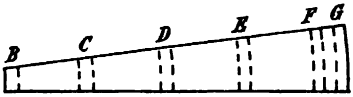
4 detached.	6.8879	6.8851	6.8819	6.8844	—.0006	—.0005	—.0007	—.0007	—.000625
5 detached.	7.7342	7.7449	7.7354	7.7344	—.0019	—.0015	—.0015	—.0017	—.001650

Breech Slice.

Taken off after second and final treatment.
State of internal strains and stresses at different phases of the slice.

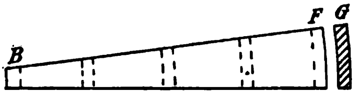
SLICE INTACT.

Interior diameter, 5″.55; exterior diameter, 16″.50.
Ring A taken out and measured at South Bethlehem.



Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
B	5.752125		.004825		25,100
C	8.125975		.000475		1,800
D	10.699025	.001725		4,800	
E	13.268075	.002975		6,700	
F	15.633725	.005275		10,100	
G	16.3027	.005250		9,700	

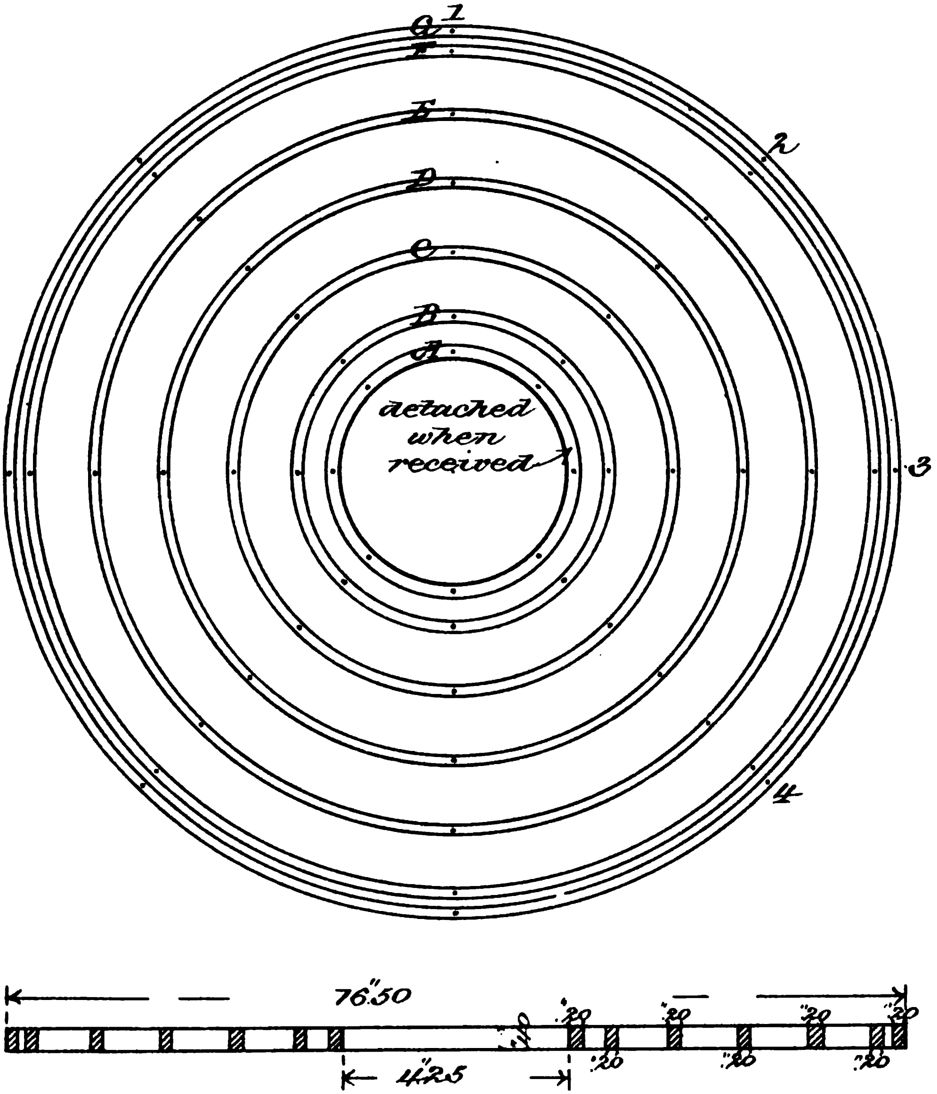
Ring G detached; rings B to F in the slice.
Interior diameter of slice, 5″.55. Exterior diameter, 15″.85.



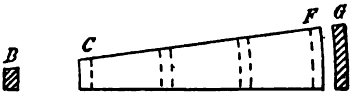
Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
B	5.752225		.004725		24,600
C	8.126175		.000275		1,000
D	10.6992	.0019		5,300	
E	13.2684	.0033		7,500	
F	15.633825	.005375		10,300	
G detached	16.297450				

Breech Slice.

Taken off after second and final treatment.

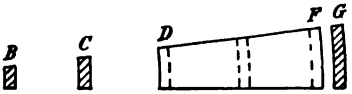


Rings B and G detached; rings C, D, E, and F in the slice. Interior diameter of slice, 7″.93. Exterior diameter, 15″.85.



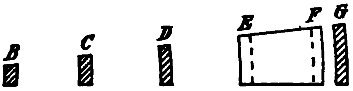
Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
B detached	5.756950				
C	8.123725		.002725		10,100
D	10.697450	.000150		400	
E	13.266550	.001450		3,300	
F	15.631950	.0035		6,700	

Rings B, C, and G detached; rings D, E, and F in the slice. Interior diameter of slice, 10″.50. Exterior diameter, 15″.85.



Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
C detached	8.126450				
D	10.695525		.001775		5,000
E	13.265125	.000025		60	
F	15.6306	.002150		4,100	

Rings B, C, D, and G detached; rings E and F in the slice. Interior diameter of slice, 13″.08. Exterior diameter, 15″.85.



Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
D detached	10.6973				
E	13.263850		.001250		2,800
F	15.6292	.000750		1,400	

RINGS ALL DETACHED.

E detached	13.2651				
F detached	15.628450				

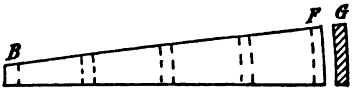
BREECH SLICE.

Taken off after second and final treatment.
Interior diameter, 5″.55. Exterior diameter, 16″.50.
Original diameters of rings in the slice.
Ring A taken out and measured at South Bethlehem.

Rings.	Diameters.				
	1.	2.	8.	4.	Mean.
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inches.*
B	5.7524	5.7525	5.7510	5.7526	5.752125
C	8.1265	8.1202	8.1250	8.1322	8.125975
D	10.7035	10.6955	10.7006	10.6965	10.699025
E	13.2690	13.2677	13.2643	13.2713	13.268075
F	15.6319	15.6312	15.6400	15.6318	15.633725
G	16.3054	16.3051	16.2973	16.3030	16.3027

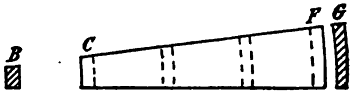
BREECH SLICE.

Taken off after second and final treatment.
Total strains released as the rings were successively detached.
Ring G detached; rings B to F in the slice.
Interior diameter of slice, 5″.55. Exterior diameter, 15″.85.



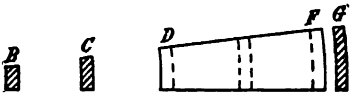
Rings.	Present diameters.				Strains released.				
					Diameters.				Mean.
	1.	2.	8.	4.	1.	2.	3.	4.	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
B	5.7525	5.7525	5.7511	5.7528	+.0001	.0000	+.0001	+.0002	+.0001
C	8.1268	8.1203	8.1252	8.1324	+.0003	+.0001	+.0002	+.0002	+.0002
D	10.7034	10.6955	10.7008	10.6971	—.0001	.0000	+.0002	+.0006	+.000175
E	13.2693	13.2679	13.2647	13.2717	+.0003	+.0002	+.0004	+.0004	+.000325
F	15.6320	15.6311	15.6400	15.6222	+.0001	—.0001	.0000	+.0004	+.0001
G detached	16.2963	16.3020	16.2965	16.2950	—.0091	—.0031	—.0008	—.0080	—.005250

Rings B and G detached; rings C, D, E, and F in the slice. Interior diameter of slice, 7″.93. Exterior diameter, 15″.85.



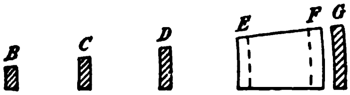
Rings.	Present diameters.				Strains released.				
					Diameters.				Mean.
	1.	2.	3.	4.	1.	2.	3.	4.	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
B detached	5.7574	5.7588	5.7566	5.7550	+.0050	+.0063	+.0056	+.0024	+.004825
C	8.1241	8.1181	8.1227	8.1300	—..0024	—.0021	—.0023	—.0022	—.002250
D	10.7019	10.6936	10.6990	10.6953	—.0016	—.0019	—.0016	—.0012	—.001575
E	13.2675	13.2661	13.2627	13.2699	—.0015	—.0016	—.0016	—.0014	—.001525
F	15.6301	15.6294	15.6382	15.6301	—.0018	—.0018	—.0018	—.0017	—.001775

Rings B, C, and G, detached; rings D, E, and F in the slice. Interior diameter of slice, 10″.50. Exterior diameter, 15″.85.



Rings.	Present diameters.				Strains released.				
					Diameters.				Mean.
	1.	2.	3.	4.	1.	2.	3.	4.	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
C detached.	8.1270	8.1210	8.1255	8.1323	+.0005	+.0008	+.0005	+.0001	+.000475
D	10.6998	10.6921	10.6969	10.6933	—.0037	—.0034	—.0037	—.0032	—.0035
E	13.2661	13.2648	13.2613	13.2683	—.0029	—.0029	—.0030	—.0030	—.002950
F	15.6287	15.6281	15.6368	15.6288	—.0032	—.0031	—.0032	—.0030	—.003125

Rings B, C, D, and G, detached; rings E and F in the slice.
Interior diameter of slice, 13″.08. Exterior diameter, 15″.85.



Rings.	Present diameters.				Strains released.				
					Diameters.				Mean.
	1.	2.	3.	4.	1.	2.	3.	4.	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
D detached	10.7012	10.6938	10.6994	10.6948	—.0023	—.0017	—.0012	—.0017	—.001725
E	13.2650	13.2636	13.2599	13.2669	—.0040	—.0041	—.0044	—.0044	—.004225
F	15.6275	15.6267	15.6353	15.6273	—.0044	—.0045	—.0047	—.0045	—.004525

RINGS ALL DETACHED.

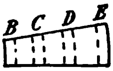
E detached	13.2665	13.2634	13.2601	13.2704	—.0025	—.0043	—.0042	—.0009	—.002975
F detached	15.6260	15.6270	15.6350	15.6258	—.0059	—.0042	—.0050	—.0060	—.005275

MUZZLE SLICE.

Taken off after second and final treatment.
State of internal strains and stresses at different phases of the slice.

SLICE INTACT.

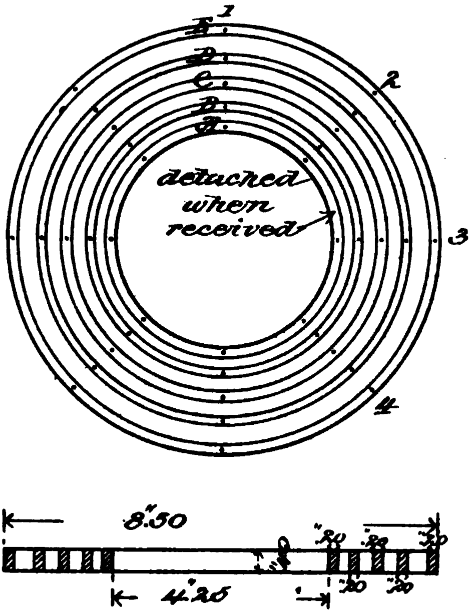
Interior diameter, 5″.00. Exterior diameter, 8″.50.
Ring A taken out and measured at South Bethlehem.



Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
B	5.195675		.003375		19,490
C	6.156125		.000650		3,170
D	7.0905	.0011		4,650	
E	8.293025	.003925		14,200	

Muzzle Slice.

Taken off after second and final treatment.



Rings B,
Interior

Rings.
D detache
E ....
F ....

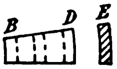
E detache
F detache

Taken
State o

Interio
Ring

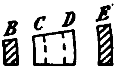
B .....
C .....
D.....
E....

Ring E detached; rings B, C, and D in the slice.
Interior diameter, 5″.00. Exterior diameter, 7″.30.



Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
B	5.196350		.0027		15,590
C	6.156775		0.		0
D	7.091175	.001750		7,400	
E detached	8.2891				

Rings E and B detached; rings C and D in the slice.
Interior diameter, 5″.95. Exterior diameter, 7″.30.



Rings.	Present mean diameter.	Strains.		Stresses per square inch.	
		Tension.	Compression.	Tension.	Compression.
	Inches.	*Inch.*	*Inch.*	*Pounds.*	*Pounds.*
B detached	5.190050				
C	6.155650		.001125		5,480
D	7.090025	.0006		2,540	

RINGS ALL DETACHED.

C detached	6.156775				
D detached	7.089425				

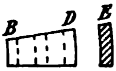
Muzzle Slice.

Taken off after second and final treatment.
Interior diameter, 5″.00. Exterior diameter, 8″.50.
Original diameters of rings in the slice.
Ring A taken out and measured at South Bethlehem.

Rings.	Diameters.				
	1.	2.	3.	4.	Mean.
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inches.*
B	5.1963	5.1952	5.1914	5.1998	5.195675
C	6.1610	6.1544	6.1533	6.1558	6.156125
D	7.0946	7.0861	7.0900	7.0913	7.0905
E	8.2932	8.2908	8.2955	8.2926	8.293025

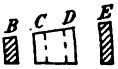
MUZZLE SLICE.

Taken off after second and final treatment.
Total strains released as the rings were successively detached.
Ring E detached; rings B, C, and D in the slice.
Interior diameter of slice, 5''.00. Exterior diameter, 7''.30.



Rings.	Present diameters.				Strains released.				
					Diameters.				Mean.
	1	2	3	4	1	2	3	4	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
B..........	5.1970	5.1957	5.1922	5.2005	+.0007	+.0005	+.0008	+.0007	+.000675
C..........	6.1615	6.1550	6.1540	6.1566	+.0005	+.0006	+.0007	+.0008	+.000650
D..........	7.0953	7.0866	7.0908	7.0920	+.0007	+.0005	+.0008	+.0007	+.000675
E detached.	8.2860	8.2935	8.2944	8.2825	—.0072	+.0027	—.0011	—.0101	—.003925

Rings E and B detached; rings C and D in the slice.
Interior diameter of slice, 5''.95. Exterior diameter, 7''.30.



Rings.	Present diameters.				Strains released.				
					Diameters.				Mean.
	1	2	3	4	1	2	3	4	
	Inches.	*Inches.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
B detached.	5.1996	5.1983	5.1951	5.2032	+.0033	+.0031	+.0037	+.0034	+.003375
C..........	6.1604	6.1539	6.1529	6.1554	—.0006	—.0005	—.0004	—.0004	—.000475
D..........	7.0940	7.0856	7.0895	7.0910	—.0006	—.0005	—.0005	—.0003	—.000475

RINGS ALL DETACHED.

C detached.	6.1615	6.1549	6.1540	6.1567	+.0005	+.0005	+.0007	+.0000	+.000650
D detached.	7.0935	7.0852	7.0890	7.0900	—.0011	—.0009	—.0011	—.0013	—.0011

METAL FOR SOFT STEEL CAPS FOR 12-INCH A. P. SHELL. LONGITUDINAL SPECIMENS TAKEN FROM BARS 6" DIAMETER BY 6" LONG.

No. of test.	Mark on specimen.	Diameter.	Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 2 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.
				Total.	Per square inch.	Total.	Per square inch.	Inches.	Per cent.				
		Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*			*In. Sq. in.*	*Per ct.*		*In. In.*
9505	24,910	.505	.20	4,810	24,050	10,840	51,700	.80	40	Diam. .81=.075	62.5	Fine silky	.52*, .28
9506	24,910	.505	.20	4,320	21,600	10,420	52,100	.76	38	Diam. .81=.075	62.5	.....do	.52*, .24
9507	24,910	.505	.20	4,280	21,400	10,260	51,300	.80	40	Diam. .83=.085	57.5	.....do	.51*, .29

CAST STEEL SHELL.

SPECIMENS FROM BODIES OF 1,000-POUND SHELL.

No. 5923.

Marks, T_1.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000050	.000050	0.	....	
2,000	10,000	.000150	.000100	....	....	
3,000	15,000	.000350	.000200	....	....	
4,000	20,000	.000500	.000150	....	....	
5,000	25,000	.000650	.000150	....	....	
6,000	30,000	.000850	.000200	0.	....	
7,000	35,000	.001000	.000150	....	....	
7,600	38,000	.001150	.000150	....	....	
7,800	39,000	.001200	.000050	....	....	
8,000	40,000	.001300	.000100	.000100	.000100	Elastic limit.
8,200	41,000	.002550	.001250	....	....	
8,400	42,000	.005500	.002950	....	....	
8,600	43,000	.007100	.001600	....	....	
8,800	44,000	.008200	.001100	....	....	
9,000	45,000	.008950	.000750	....	....	
15,660	78,300	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	78,300
Elastic limit per square inch of original section	do	40,000
Elongation per inch after rupture	inch	.0900
Elongation per inch under strain at elastic limit	do	.001300
Reduction in diameter at point of rupture	do	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		".65 from neck
Character of broken surface		granular, dull silky spot at the circumference
Elongation of inch sections		".10*, ".08

No. 5924.

Marks, T_2.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000250	.000150	....	....	
4,000	20,000	.000600	.000350	....	....	
6,000	30,000	.000950	.000350	.000050	.000050	
6,200	31,000	.001050	.000100	....	....	
6,400	32,000	.001100	.000050	....	....	Elastic limit.
6,600	33,000	.001300	.000200	....	....	
6,800	34,000	.001700	.000400	....	....	
7,000	35,000	.002400	.000700	....	....	
7,200	36,000	.003250	.000850	....	....	
7,400	37,000	.004050	.000800	....	....	
7,600	38,000	.004900	.000850	....	....	
7,800	39,000	.005800	.000900	....	....	
8,000	40,000	.006750	.000950	....	....	
14,910	74,550	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	74,550
Elastic limit per square inch of original section	do	32,000
Elongation per inch after rupture	inch	.1050
Elongation per inch under strain at elastic limit	do	.001100
Reduction in diameter at point of rupture	do	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		″.30 from neck
Character of broken surface		medium granular
Elongation of inch sections		″.10, ″.11*

No. 5925.

Marks, T_3.
Diameter, ''.505.
Sectional area, .20 square inch.
Gauged length, 2''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	....	....	
2,000	10,000	.000200	.000100	....	....	
4,000	20,000	.000500	.000300	....	....	
5,800	29,000	.000850	.000350	....	....	Elastic limit.
6,000	30,000	.001000	.000150	.000150	.000150	
6,200	31,000	.001300	.000300	....	....	
6,400	32,000	.001450	.000150	....	....	
6,600	33,000	.001650	.000200	....	....	
6,800	34,000	.002050	.000400	....	....	
7,000	35,000	.002900	.000850	.001650	.001500	
7,200	36,000	.003500	.000600	....	....	
7,400	37,000	.004400	.000900	....	....	
7,600	38,000	.005400	.001000	....	....	
7,800	39,000	.006200	.000800	....	....	
8,000	40,000	.007150	.000950	....	....	
14,620	73,100	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	73,100
Elastic limit per square inch of original section....................do...	29,000
Elongation per inch after rupture....................inch..	.1150
Elongation per inch under strain at elastic limit ....do...	.000850
Reduction in diameter at point of rupture ....do...	.035
Reduction in area after rupture, per cent of original section	13.2
Position of rupture....................	''.50 from neck
Character of broken surface....................	medium granular
Elongation of inch sections....................	''.09, ''.14*

No. 5943.

Marks, T 4849.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000250	.000150	....	....	
4,000	20,000	.000600	.000350	....	....	
6,000	30,000	.000900	.000300	0.	....	
6,200	31,000	.000950	.000050	....	....	
6,400	32,000	.001050	.000100	....	....	
6,600	33,000	.001150	.000100	....	....	Elastic limit.
6,800	34,000	.002500	.001350	....	....	
7,000	35,000	.004450	.001950	....	....	
7,200	36,000	.004900	.000450	....	....	
7,400	37,000	.005750	.000850	....	....	
7,600	38,000	.006650	.000900	....	....	
7,800	39,000	.007800	.001150	....	....	
8,000	40,000	.008700	.000900	.007200	.007200	
8,400	42,000	.010700	.002000	....	....	
8,800	44,000	.013000	.002300	....	....	
9,200	46,000	.015750	.002750	....	....	
9,600	48,000	.017250	.001500	....	....	
10,000	50,000	.020150	.002900	....	....	
10,400	52,000	.022500	.002350	....	....	
10,800	54,000	.025500	.003000	....	....	
11,200	56,000	.028250	.002750	....	....	
11,600	58,000	.031750	.003500	....	....	
12,000	60,000	.036000	.004250	....	....	
12,400	62,000	.040000	.004000	....	....	
12.800	64,000	.045000	.005000	....	....	
13,200	66.000	.050100	.005100	....	....	
13,600	68,000	.057000	.006900	....	....	
14,000	70,000	.065500	.008500	....	....	
14,400	72,000	.076000	.010500	....	....	
14,800	74,000	.089000	.013000	....	....	
15,200	76,000	.1150	.0260	....	....	
15,600	78,000	.1500	.0350	....	....	
15,610	78,050	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	78,050
Elastic limit per square inch of original section	do	33,000
Elongation per inch after rupture	inch	.2000
Elongation per inch under strain at elastic limit	do	.001150
Reduction in diameter at point of rupture	do	.055
Reduction in area after rupture, per cent of original section		20.5
Position of rupture		″.8 from neck
Character of broken surface		granular, radiating from a silky spot in the circumference
Elongation of inch sections		″.22*, ″.18

No. 5944.

Marks, T 4855.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000350	.000250	....	....	
4,000	20,000	.000600	.000250	....	....	
6,000	30,000	.001000	.000400	0.	....	
7,800	39,000	.001500	.000500	....	....	Elastic limit.
8,000	40,000	.001850	.000350	.000500	.000500	
8,200	41,000	.008650	.006800	....	....	
8,400	42,000	.009500	.000850	....	....	
8,600	43,000	.010600	.001100	....	....	
8,800	44,000	.011500	.000900	....	....	
9,000	45,000	.012450	.000950	....	....	
9,200	46,000	.013700	.001250	....	....	
9,600	48,000	.015600	.001900	....	....	
10,000	50,000	.018100	.002500	....	....	
10,400	52,000	.020000	.001900	....	....	
10,800	54,000	.022250	.002250	....	....	
11,200	56,000	.025500	.003250	....	....	
11,600	58,000	.028550	.003050	....	....	
12,000	60,000	.032000	.003450	....	....	
12,400	62,000	.035750	.003750	....	....	
12,800	64,000	.040000	.004250	....	....	
13,200	66,000	.044500	.004500	....	....	
13,600	68,000	.049250	.004750	....	....	
14,000	70,000	.055000	.005750	....	....	
14,400	72,000	.063500	.008500	....	....	
14,800	74,000	.073250	.009750	....	....	
15,200	76,000	.085000	.011750	....	....	
15,600	78,000	.1000	.0150	....	....	
15,940	79,700	....	....	....	....	Tensile strength.

General summary.

Tensile strength, per square inch of original section ....pounds..	79,700
Elastic limit per square of original section....................do...	39,000
Elongation per inch after rupture....................inch..	.1400
Elongation per inch under strain at elastic limit....................do...	.001500
Reduction in diameter at point of rupture ....do. .	.035
Reduction in area after rupture, per cent of original section....................	13.2
Position of rupture....................	1″.1 from neck
Character of broken surface....................	granular, radiating from a silky spot in the circumference
Elongation of inch sections	″.15*, ″.13

No. 5945.

Marks, 11212.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000650	.000350	....	....	
6,000	30,000	.001000	.000350	0.	....	
7,600	38,000	.001600	.000600	....	....	Elastic limit.
7,800	39,000	.001800	.000200	....	....	
8,000	40,000	.002200	.000400	....	....	
8,200	41,000	.002500	.000300	....	....	
8,400	42,000	.002800	.000300	....	....	
8,600	43,000	.003500	.000700	....	....	
8,800	44,000	.004400	.000900	....	....	
9,000	45,000	.005000	.000600	....	....	
9,200	46,000	.005650	.000650	....	....	
9,600	48,000	.007100	.001450	....	....	
10.000	50,000	.008850	.001750	....	....	
10.400	52,000	.010100	.001250	....	....	
10,800	54,000	.011750	.001650	....	....	
11,200	56,000	.013500	.001750	....	....	
11,600	58,000	.015000	.001500	....	....	
12.000	60,000	.017150	.002150	....	....	
12,400	62,000	.019250	.002100	....	....	
12,800	64,000	.021250	.002000	....	....	
13,200	66,000	.023500	.002250	....	....	
13,600	68,000	.026000	.002500	....	....	
14,000	70,000	.028650	.002650	....	....	
14,400	72,000	.031100	.002550	....	....	
14,800	74,000	.034000	.002900	....	....	
15.200	76,000	.037500	.003500	....	....	
15,600	78,000	.041150	.003650	....	....	
16,000	80,000	.045250	.004100	....	....	
16,400	82,000	.050500	.005250	....	....	
16,800	84,000	.055600	.005100	....	....	
17,200	86,000	.062500	.006900	....	....	
17,600	88,000	.072000	.009500	....	....	
18,000	90,000	.083750	.011750	....	....	
18,400	92,000	.1050	.021250	....	....	
18,710	93,550	.1800	.0750	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section..................................pounds..	93,550
Elastic limit per square inch of original section..................................do...	38.000
Elongation per inch after rupture..................................inch..	.2400
Elongation per inch under strain at elastic limit..................................do...	.001600
Reduction in diameter at point of rupture..................................do...	.095
Reduction in area after rupture, per cent of original section..................................	34.0
Position of rupture..................................	″.9 from neck
Character of broken surface..................................	silky center, granular at circumference
Elongation of inch sections..................................	″.30, ″.18

No. 5946.

Marks, 11212.
Diameter, ".505.
Sectional area, .20 square inch.
Gauged length, 2".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	....	
2,000	10,000	.000400	.000250	....	....	
4,000	20,000	.000650	.000250	....	....	
6,000	30,000	.001000	.000350	0.	....	
7,600	38,000	.001600	.000600	....	....	Elastic limit.
7,800	39,000	.001800	.000200	....	....	
8,000	40,000	.002350	.000550	.000850	.000850	
8,200	41,000	.002700	.000350	....	....	
8,400	42,000	.003300	.000600	....	....	
8,600	43,000	.004450	.001150	....	....	
8,800	44,000	.005100	.000650	....	....	
9,000	45,000	.005700	.000600	....	....	
9,200	46,000	.006550	.000850	....	....	
9,600	48,000	.007600	.001050	....	....	
10,000	50,000	.009500	.001900	....	....	
10,400	52,000	.011000	.001500	....	....	
10,800	54,000	.012500	.001500	....	....	
11,200	56,000	.014450	.001950	....	....	
11,600	58,000	.016100	.001650	....	....	
12,000	60,000	.018450	.002350	....	....	
12,400	62,000	.020250	.001800	....	....	
12,800	64,000	.022500	.002250	....	....	
13,200	66,000	.025000	.002500	....	....	
13,600	68,000	.027500	.002500	....	....	
14,000	70,000	.030500	.003000	....	....	
14,400	72,000	.033750	.003250	....	....	
14,800	74,000	.036500	.002750	....	....	
15,200	76,000	.040500	.004000	....	....	
15,600	78,000	.044250	.003750	....	....	
16,000	80,000	.048750	.004500	....	....	
16,400	82,000	.054150	.005400	....	....	
16,800	84,000	.061000	.006850	....	....	
17,200	86,000	.070000	.009000	....	....	
17,600	88,000	.081100	.011100	....	....	
18,000	90,000	.1000	.0189	....	....	
18,400	92,000	.1350	.0350	....	....	
18,410	92,050	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	92,050
Elastic limit per square inch of original section	do	38,000
Elongation per inch after rupture	inch	.2350
Elongation per inch under strain at elastic limit	do	.001600
Reduction in diameter at point of rupture	do	.105
Reduction in area after rupture, per cent of original section		37.1
Position of rupture		".95 from neck
Character of broken surface		silky, interspersed with granular metal at the circumference
Elongation of inch sections		".30*, ".17

No. 5956.

Marks, 4863.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100			
2,000	10,000	.000350	.000250			
4,000	20,000	.000650	.000300			
5,800	29,000	.000950	.000300			Elastic limit.
6,000	30,000	.001100	.000150	.000150	.000150	
6,200	31,000	.001300	.000200			
6,400	32,000	.001450	.000150			
6,600	33,000	.001700	.000250			
6,800	34,000	.002350	.000650			
7,000	35,000	.003250	.000900	.002000	.001850	
7,200	36,000	.003900	.000650			
7,400	37,000	.004500	.000600			
7,600	38,000	.005550	.001050			
7,800	39,000	.006250	.000700			
8,000	40,000	.007400	.001150			
8,400	42,000	.009050	.001650			
8,800	44,000	.011050	.002000			
9,200	46,000	.013500	.002450			
9,600	48,090	.015350	.001850			
10,000	50,000	.017850	.002500			
10,400	52,000	.020300	.002450			
10,800	54,000	.023750	.003450			
11,200	56,000	.026150	.002400			
11,600	58,000	.029500	.003350			
12,000	60,000	.034500	.005000			
12,800	64,000	.0450	.0105			
13,600	68,000	.0600	.0150			
14,400	72,000					Tensile strength.

General summary.

Tensile strength per square inch of original section	**pounds..**	**72,000**
Elastic limit per square inch of original section	**do...**	**29,000**
Elongation per inch after rupture	**inch..**	**.0900**
Elongation per inch under strain at elastic limit	**do...**	**.000950**
Reduction in diameter at point of rupture	**do...**	**.025**
Reduction in area after rupture, per cent of original section		**9.5**
Position of rupture		**″.48 from neck**
Character of broken surface		**fine and medium granular metal interspersed**
Elongation of inch sections		**″.08, ″.10***

No. 5957.

Marks, 4870.
Diameter, ''.505.
Sectional area, .20 square inch.
Gauged length, 2''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000350	.000250	....	....	
4,000	20,000	.000550	.000200	....	....	
6,000	30,000	.001050	.000500	.000100	.000100	Elastic limit.
6,200	31,000	.001300	.000250	....	....	
6,400	32,000	.001500	.000200	....	....	
6,600	33,000	.001800	.000300	....	....	
6,800	34,000	.002150	.000350	....	....	
7,000	35,000	.003000	.000850	.001750	.001650	
7,200	36,000	.004000	.001000	....	....	
7,400	37,000	.004650	.000650	....	....	
7,600	38,000	.005750	.001100	....	....	
7,800	39,000	.006600	.000850	....	....	
8,000	40,000	.007500	.000900	....	....	
8,400	42,000	.009100	.001600	....	....	
8,800	44,000	.011250	.002150	....	....	
9,200	46,000	.013500	.002250	....	....	
9,600	48,000	.015500	.002000	....	....	
10,000	50,000	.018000	.002500	....	....	
10,400	52,000	.020500	.002500	....	....	
10,800	54,000	.023550	.003050	....	....	
11,200	56,000	.026750	.003200	....	....	
11,600	58,000	.030000	.003250	....	....	
12,000	60,000	.033500	.003500	....	....	
12,800	64,000	.0450	.0115	....	....	
13,600	68,000	.0600	.0150	....	....	
14,400	72,000	.0850	.0250	....	....	
14,590	72,950	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	72,950
Elastic limit per square inch of original section	do...	30,000
Elongation per inch after rupture	inch..	.1100
Elongation per inch under strain at elastic limit	do...	.001050
Reduction in diameter at point of rupture	do...	.035
Reduction in area after rupture, per cent of original section		18.2
Position of rupture		''.65 from neck
Character of broken surface		fine and medium granular metal interspersed
Elongation of inch sections		''.12*, ''.10

No. 5958.

Marks, 4877.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000600	.000300	....	....	
6,000	30,000	.001050	.000450	.000050	.000050	
6,200	31,000	.001100	.000050	....	....	
6,400	32,000	.001150	.000050	....	....	
6,600	33,000	.001200	.000050	....	....	Elastic limit.
6,800	34,000	.001350	.000050	....	....	
7,000	35,000	.001500	.000050	.000200	.000150	
7,200	36,000	.001600	.000100	....	....	
7,400	37,000	.001700	.000100	....	....	
7,600	38,000	.002150	.000450	....	....	
7,800	39,000	.003800	.001650	....	....	
8,000	40,000	.006650	.002850	....	....	
8,400	42,000	.008650	.002000	....	....	
8,800	44,000	.010850	.002200	....	....	
9,200	46,000	.012400	.001550	....	....	
9,600	48,000	.014450	.002050	....	....	
10,000	50,000	.016500	.092050	....	....	
10,400	52,000	.019150	.052650	....	....	
10,800	54,000	.021100	.001950	....	....	
11,200	56,000	.024500	.003400	....	....	
11,600	58,000	.027500	.003000	....	....	
12,000	60,000	.030500	.003000	....	....	
12,800	64,000	.0400	.0095	....	....	
13,600	68,000	.0500	.0100	....	....	
14,400	72,000	.0650	.0150	....	....	
15,200	76,000	.0850	.0200	....	....	
15,480	77,400	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	77,400
Elastic limit per square inch of original section	do...	33,000
Elongation per inch after rupture	inch..	.1050
Elongation per inch under strain at elastic limit	do...	.001200
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		″.55 from neck
Character of broken surface		fine and medium, granular metal interspersed
Elongation of inch sections		″.10, ″.11″

No. 5959.

Marks, 4885.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000100	.000100	0.	....	
2, 000	10, 000	.000350	.000250	....	....	
4, 000	20, 000	.000650	.000300	....	....	
5, 600	28, 000	.001050	.000400	....	....	Elastic limit.
5, 800	29, 000	.001350	.000300	....	....	
6, 000	30, 000	.001650	.000300	....	....	
6, 200	31. 000	.002200	.000550	....	....	
6, 400	32, 000	.003050	.000850	....	....	
6, 600	33, 000	.004000	.000950	....	....	
6, 800	34, 000	.004750	.000750	....	....	
7, 000	35, 000	.005900	.001150	.001500	.004500	
7, 200	36, 000	.006600	.000700	....	....	
7, 400	37, 000	.007600	.001000	....	....	
7, 600	38, 000	.008550	.000950	....	....	
7, 800	39, 000	.010000	.001450	....	....	
8, 000	40, 000	.011000	.001000	....	....	
8, 400	42, 000	.013350	.002350	....	....	
8, 800	44, 000	.015600	.002250	....	....	
9, 200	46, 000	.018500	.002900	....	....	
9, 600	48, 000	.020900	.002400	....	....	
10, 000	50, 000	.024400	.003500	....	....	
10, 400	52, 000	.027000	.002600	....	....	
10, 800	54, 000	.031400	.004400	....	....	
11, 200	56, 000	.036000	.004600	....	....	
11, 600	58, 000	.040000	.004000	....	....	
12, 000	60, 000	.046500	.006500	....	....	
12, 800	64, 000	.0650	.0185	....	....	
13, 600	68, 000	.0950	.0300	....	....	
13, 990	69, 950	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	69, 950
Elastic limit per square inch of original section	do...	28, 000
Elongation per inch after rupture	inch..	.1300
Elongation per inch under strain at elastic limit	do...	.001050
Reduction in diameter at point of rupture	do...	.035
Reduction in area after rupture, per cent of original section		13. 2
Position of rupture		″.75 from neck
Character of broken surface		medium granular
Elongation of inch sections		″.14*, ″.12

No. 5960.

Marks, 4891.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000600	.000300	....	....	
6,000	30,000	.001000	.000400	0.	....	
6,600	33,000	.001100	.000100	....	....	Elastic limit.
6,800	34,000	.001250	.000150	....	....	
7,000	35,000	.001500	.000250	.000350	.000350	
7,200	36,000	.001950	.000450	....	....	
7,400	37,000	.003050	.001100	....	....	
7,600	38,000	.004650	.001600	....	....	
7,800	39,000	.005650	.001000	....	....	
8,000	40,000	.006500	.000850	....	....	
8,400	42,000	.008000	.001500	....	....	
8,800	44,000	.010250	.002250	....	....	
9,200	46,000	.012400	.002150	....	....	
9,600	48,000	.014400	.002000	....	....	
10,000	50,000	.016500	.002100	....	....	
10,400	52,000	.019000	.002500	....	....	
10,800	54,000	.021550	.002550	....	....	
11,200	56,000	.024500	.002950	....	....	
11,600	58,000	.027250	.002750	....	....	
12,000	60,000	.031750	.004500	....	....	
12,800	64,000	.0400	.008250	....	....	
13,600	68,000	.0550	.0150	....	....	
14,400	72,000	.0750	.0200	....	....	
14,520	72,600	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	72,600
Elastic limit per square inch of original section ....do...	33,000
Elongation per inch after rupture..........inch..	.0850
Elongation per inch under strain at elastic limit..........do...	.001100
Reduction in diameter at point of rupture..........do...	.025
Reduction in area after rupture, per cent of original section	9.5
Position of rupture	″.25 from neck
Character of broken surface.....granular at circumference, 50 per cent; dull silky center, 50 per cent	
Elongation of inch sections..........	″.08, ″.09*

No. 5961.

Marks, 4898.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000350	.000250	....	....	
4,000	20.000	.000650	.000300	....	....	
6,000	30,000	.001000	.000350	.000050	.000050	
6,200	31,000	.001050	.000050	....	....	
6,400	32,000	.001100	.000050	....	....	Elastic limit.
6,600	33,000	.001200	.000100	....	....	
6,800	34,000	.001300	.000100	....	....	
7,000	35.000	.001450	.000150	.000250	.000200	
7,200	36,000	.001550	.000100	....	....	
7,400	37,000	.001750	.000200	....	....	
7,600	38,000	.002250	.000500	....	....	
7,800	39,000	.004900	.002650	....	....	
8,000	40,000	.006400	.001500	....	....	
8,400	42,000	.008350	.001950	....	....	
8,800	44,000	.010250	.001900	....	....	
9,200	46,000	.012300	.002050	....	....	
9,600	48,000	.014500	.002200	....	....	
10,000	50,000	.017000	.002500	....	....	
10,400	52,000	.019000	.002000	....	....	
10,800	54,000	.022100	.003100	....	....	
11,200	56,000	.025500	.003400	....	....	
11,600	58,000	.029250	.003750	....	....	
12,000	60,000	.032500	.003250	....	....	
12,800	64,000	.0400	.0075	....	....	
13,600	68,000	.0550	.0150	....	....	
14,310	71,550	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section................................pounds..	**71,550**
Elastic limit per square inch of original section................................do...	**32,000**
Elongation per inch after rupture................................inch..	**.0850**
Elongation per inch under strain at elastic limit................................do...	**.001100**
Reduction in diameter at point of rupture................................do...	**.025**
Reduction in area after rupture, per cent of original section................................	**9.5**
Position of rupture................................	**1″.05 from neck**
Character of broken surface................................	**medium and fine granulation interspersed**
Elongation of inch sections................................	**″.08, ″.09***

No. 5962.

Marks, 4905.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000650	.000350	....	....	
5,000	25,000	.000900	.000250	....	....	
6,000	30,000	.001000	.000100	0.	....	
7,000	35,000	.001200	.000200	....	....	
8,000	40,000	.001500	.000300	.000100	.000100	Elastic limit.
8,200	41,000	.001750	.000250	....	....	
8,400	42,000	.008750	.007000	....	....	
8,600	43,000	.009500	.000750	....	....	
8,800	44,000	.010250	.000750	....	....	
9,000	45,000	.011050	.000800	....	....	
9,200	46,000	.012050	,001000	....	....	
9,600	48,000	.014150	.002100	....	....	
10,000	50,000	.016250	.002100	....	....	
10,400	52,000	.018550	.002300	....	....	
10.800	54,000	.022000	.003450	....	....	
11,200	56,000	.023900	.001900	....	....	
11,600	58,000	.027500	.003600	....	....	
12,000	60,000	.029800	.002300	....	....	
12,800	64,000	.0400	.0102	....	....	
13,600	68,000	.0500	.0100	....	....	
14,400	72,000	.0600	.0100	....	....	
15,020	75,100	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	75,100
Elastic limit per square inch of original section	do...	40,000
Elongation per inch after rupture	inch..	.0800
Elongation per inch under strain at elastic limit	do...	.001500
Reduction in diameter at point of rupture	do...	.025
Reduction in area after rupture, per cent of original section		9.5
Position of rupture		″.90 from neck
Character of broken surface		granular, 60 per cent; dull silky, 40 per cent
Elongation of inch sections		″.09*, ″.07

No. 5963.

Marks, 4912.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000250	.000150	....	....	
4,000	20,000	.000600	.000350	....	....	
5,000	25,000	.000850	.000250	....	....	
6,000	30,000	.001000	.000150	0.	....	
7,000	35,000	.001200	.000200	....	....	Elastic limit.
7,200	36,000	.001350	.000150	....	....	
7,400	37,000	.001500	.000150	....	....	
7,600	38,000	.001600	.000100	....	....	
7,800	39,000	.002000	.000400	....	....	
8,000	40,000	.006900	.004900	....	....	
8,400	42,000	.008400	.001500	....	....	
8,800	44,000	.010900	.002500	....	....	
9,200	46,000	.012650	.001750	....	....	
9,600	48,000	.014500	.001850	....	....	
10,000	50,000	.016500	.002000	....	....	
10,400	52,000	.018900	.002400	....	....	
10,800	54,000	.020900	.002000	....	....	
11,200	56,000	.023250	.002350	....	....	
11,600	58,000	.026500	.003250	....	....	
12,000	60,000	.029600	.003100	....	....	
12,800	64,000	.0350	.0054	....	....	
13,600	68,000	.0500	.0150	....	....	
14,400	72,000	.0600	.0100	....	....	
15,200	76,000	.0800	.0200	....	....	
15,620	78,100	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	**pounds..**	**78,100**
Elastic limit per square inch of original section	**do...**	**35,000**
Elongation per inch after rupture	**inch..**	**.1000**
Elongation per inch under strain at elastic limit	**do...**	**.001200**
Reduction in diameter at point of rupture	**do...**	**.035**
Reduction in area after rupture, per cent of original section		**13.2**
Position of rupture		**″.75 from neck**
Character of broken surface		**granular, 70 per cent; dull silky, 30 per cent**
Elongation of inch sections		**″.11*, ″.09**

No. 5964.

Marks, 4918.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000100	.000100	0.	....	
2, 000	10, 000	.000300	.000200	....	....	
4, 000	20, 000	.000600	.000300	....	....	
5, 000	25, 000	.000850	.000250	....	....	
6. 000	30, 000	.001050	.000200	0.	....	
6, 200	31, 000	.001100	.000050	....	....	
6, 400	32, 000	.001150	.000050	....	....	
6, 600	33, 000	.001250	.000100	....	....	
6, 800	34, 000	.001300	.000050	....	....	Elastic limit.
7, 000	35, 000	.001450	.000150	....	....	
7, 200	36, 000	.002050	.000600	....	....	
7, 400	37, 000	.002400	.000350	....	....	
7, 600	38, 000	.002800	.000400	....	....	
7, 800	39, 000	.003000	.000200	....	....	
8, 000	40, 000	.005000	.002000	....	....	
8, 400	42, 000	.006600	.001600	....	....	
8, 800	44, 000	.007600	.001000	....	....	
9, 200	46, 000	.012000	.004400	....	....	
9, 600	48, 000	.013600	.001600	....	....	
10, 000	50, 000	.015500	.001900	....	....	
10, 400	52, 000	.018050	.002550	....	....	
10, 800	54, 000	.019650	.001600	....	....	
11, 200	56, 000	.022100	.002450	....	....	
11, 600	58, 000	.025000	.002900	....	....	
12, 000	60, 000	.028000	.003000	....	....	
12, 800	64, 000	.0350	.0070	....	....	
13, 600	68, 000	.0450	.0100	....	....	
14, 400	72, 000	.0500	.0050	....	....	
15, 200	76, 000	.0700	.0200	....	....	
16, 000	80, 000	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	80, 000
Elastic limit per square inch of original section	do...	34, 000
Elongation per inch after rupture	inch..	.1050
Elongation per inch under strain at elastic limit	do...	.001300
Reduction in diameter at point of rupture	do...	.035
Reduction in area after rupture, per cent of original section		13.2
Position of rupture		″.50 from neck
Character of broken surface		granular, 85 per cent; dull silky, 15 per cent
Elongation of inch sections		″.12*, ″.09

No. 5965.

Marks, 4925.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000350	.000250	....	....	
4,000	20,000	.000650	.000300	....	....	
5,000	25,000	.000850	.000200	....	....	
6,000	30,000	.001050	.000200	0.	....	
6,600	33,000	.001150	.000100	....	....	Elastic limit.
6,800	34,000	.001250	.000100	....	....	
7,000	35,000	.001450	.000200	....	....	
7,200	36,000	.001600	.000150	....	....	
7,400	37,000	.001900	.000300	....	....	
7,600	38,000	.002250	.000350	....	....	
7,800	39,000	.002950	.000700	....	....	
8,000	40,000	.003600	.000650	.002150	.002150	
8,400	42,000	.005050	.001450	....	....	
8,800	44,000	.007150	.002100	....	....	
9,200	46,000	.008950	.001800	....	....	
9,600	48,000	.010750	.001800	....	....	
10,000	50,000	.012250	.001500	....	....	
10,400	52,000	.015100	.002850	....	....	
10,800	54,000	.017000	.001900	....	....	
11,200	56,000	.019600	.002600	....	....	
11,600	58,000	.022400	.002800	....	....	
12,000	60,000	.026000	.003600	....	....	
12,800	64,000	.0350	.0090	....	....	
13,600	68,000	.0450	.0100	....	....	
14,200	71,000	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	71,000
Elastic limit per square inch of original section	do...	33,000
Elongation per inch after rupture	inch..	.0550
Elongation per inch under strain at elastic limit	do...	.001150
Reduction in diameter at point of rupture	do...	.015
Reduction in area after rupture, per cent of original section		5.7
Position of rupture		″.20 from neck
Character of broken surface		medium granular
Elongation of inch sections		″.0*, ″.04

No. 5966.

Marks, 4931.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
4,000	20,000	.000650	.000350	....	....	
5,000	25,000	.000850	.000200	....	....	
6,000	30,000	.001050	.000200	.000050	.000050	
6,800	34,000	.001300	.000250	....	....	Elastic limit.
7,000	35,000	.001400	.000100	.000150	.000100	
7,200	36,000	.001550	.000150	....	....	
7,400	37,000	.001650	.000100	....	....	
7,600	38,000	.001850	.000200	....	....	
7,800	39,000	.002400	.000550	....	....	
8,000	40,000	.006400	.004000	....	....	
8,400	42,000	.008550	.002150	....	....	
8,800	44,000	.010700	.002150	....	....	
9,200	46,000	.012650	.001950	....	....	
9,600	48,000	.015000	.002350	....	....	
10,000	50,000	.017000	.002000	....	....	
10,400	52,000	.019400	.002400	....	....	
10,800	54,000	.021900	.002500	....	....	
11,200	56,000	.025000	.003100	....	....	
11,600	58,000	.029000	.004000	....	....	
12,000	60,000	.031750	.002750	....	....	
12,800	64,000	.0400	.008250	....	....	
13 600	68,000	.0500	.0100	....	....	
14,400	72,000	.0650	.0150	....	....	
14,880	74,400	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	74,000
Elastic limit per square inch of original section	do...	34,000
Elongation per inch after rupture	inch..	.0950
Elongation per inch under strain at elastic limit	do ..	.001300
Reduction in diameter at point of rupture	do...	.035
Reduction in area after rupture, per cent of original section		13.2
Position of rupture		″.40 from neck
Character of broken surface		granular, 60 per cent; dull silky, 40 per cent
Elongation of inch sections		″.11*, ″.08

TABULATION OF TENSION SPECIMENS FROM CAST STEEL BODIES OF 1,000-POUND SHELL (STEMS 2" LONG).

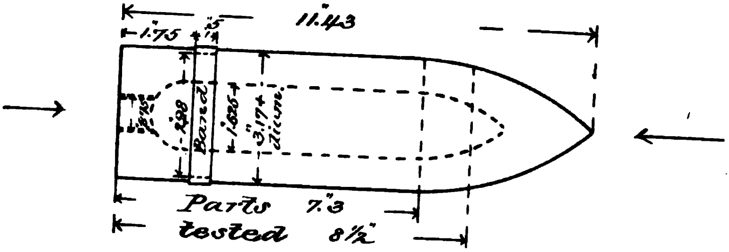
No. of test.	Marks.	Diameter.	Sectional area.	Elastic limit per sq. inch.	Tensile strength per sq. inch.	Elongation in 2 inches.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.
		Inch.	*Sq. inch.*	*Pounds.*	*Pounds.*	*Per cent.*	*Per cent.*		" "
5923	T_1	0.505	0.20	40,000	78,300	9.0	9.5	Granular; dull silky spot at circumference	.10*, .08
5924	T_2	.505	.20	32,000	74,550	10.5	9.5	Medium granular	.10, .11*
5925	T_3	.505	.20	29,000	73,100	11.5	13.2	.....do	.09, .14*
5943	T 4849	.505	.20	33,000	78,050	20.0	20.5	Granular, radiating from a silky spot in the circumference	.22*, .18
5944	T 4855	.505	.20	39,000	79,700	14.0	13.2	.....do	.15*, .13
5945	11212	.505	.20	38,000	93,550	24.0	34.0	Silky center, granular at circumference	.30*, .18
5946	11212	.505	.20	38,000	92,050	23.5	37.1	Silky, interspersed with granular metal at the circumference	.30*, .17
5956	4863	.505	.20	29,000	72,000	9.0	9.5	Fine and medium granular metal interspersed	.08, .10*
5957	4870	.505	.20	30,000	72,950	11.0	13.2	.....do	.12*, .10
5958	4877	.505	.20	33,000	77,400	10.5	9.5	.....do	.10, .11*
5959	4885	.505	.20	28,000	69,950	13.0	13.3	Medium granular	.14*, .12
5960	4891	.505	.20	33,000	72,600	8.5	9.5	Granular at circumference, 50 per cent; dull silky center, 50 per cent	.08, .09*
5961	4898	.505	.20	32,000	71,550	8.5	9.5	Medium and fine granulation interspersed	.08, .09*
5962	4905	.505	.20	40,000	75,100	8.0	9.5	Granular, 60 per cent; dull silky, 40 per cent	.09*, .07
5963	4912	.505	.20	35,000	78,100	10.0	13.2	Granular, 70 per cent; dull silky, 30 per cent	.11*, .09
5964	4918	.505	.20	34,000	80,000	10.5	13.2	Granular, 85 per cent; dull silky, 15 per cent	.12*, .09
5965	4925	.505	.20	33,000	71,000	5.5	5.7	Medium granular	.07*, .04
5966	4931	.505	.20	34,000	74,400	9.5	13.2	Granular, 60 per cent; dull silky, 40 per cent	.11*, .08

COMPRESSION OF CAST-IRON SHELLS

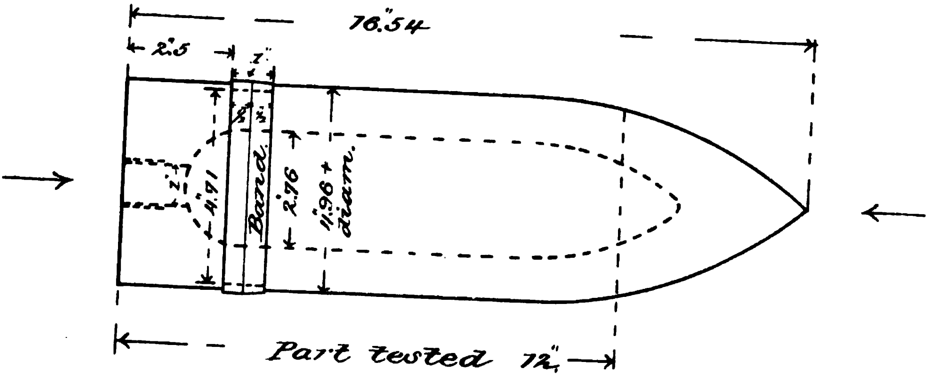
FOR

3.2-INCH RIFLES AND 5-INCH R. F. GUNS.

3.2-inch Shell.



Shell for 5-inch R. F. Gun.



No. 9495.

SHELL FOR 5-INCH R. F. GUN.

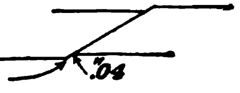
Diameter of shell in front of band, 4″.97.
Sectional area (approximate) in front of band, 13.42 square inches.
Point cut off, leaving remaining part of shell 12″ long.
Diametrical expansion measured on three diameters: Diameter A, ½″ in front of band; B, 2½″ in front of band, and C, 4½″ in front of band.

Applied loads.		Diametrical expansion.			Remarks.
		Diameters.			
Total.	Per square inch.	A.	B.	C.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	
13, 420	1, 000	0.	0.	0.	Initial load.
134, 200	10, 000	.0010			
268, 400	20, 000	.0019			
402, 600	30, 000	.0040			
13, 420	1, 000	.0015			
402, 600	30, 000	.0043			
13, 420	1, 000	.0015			
402, 600	30, 000	.0048			
13, 420	1, 000	.0015			
13, 420	1, 000		0.		
402, 600	30, 000		.0023		
13, 420	1, 000		.0000		
13, 420	1, 000			0.	
402. 600	30, 000			.0022	
13, 420	1, 000			.0000	
13, 420	1, 000	.0019			
402, 600	30, 000	.0045			
469, 700	35, 000	.0065			
536, 800	40, 000	.0115			
13, 420	1, 000	.0075			
603, 900	45, 000	.0194			
13, 420	1, 000	.0150			
671, 000	50, 000				
13, 420	1, 000	.0239			
738, 100	55, 000				
13, 420	1, 000	.0372			
800, 000	59, 610				
13, 420	1, 000	.0489			

The metal of the shell was upset locally at the heel of each end of the scarf joint of the copper band.

The ends of the band moved and made an offset with each other about ″.04.

Local upsetting of cast iron.



No. 9496.

SHELL FOR 5-INCH R. F. GUN.

Diameter of shell in front of band, 4″.965.
Sectional area (approximate) in front of band, 13.38 square inches.
Point cut off, leaving remaining part of shell 12″ long.
Diametrical expansion measured on two diameters: Diameter A, ″.10 in front of band, and B, 2″.1 in front of band.

Applied loads.		Diametrical expansion.		Remarks.
		Diameters.		
Total.	Per square inch.	A.	B.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
13,380	1,000	0.	0.	Initial load.
267,600	20,000	.0020	....	
13,380	1,000	.0002	....	
13,380	1,000	....	0.	
267,600	20,000	....	.0014	
13,380	1,000	....	.0000	
535,200	40,000	....	.0075	
13,380	1,000	....	.0038	
13,380	1,000	.0046	....	
535,200	40,000	.0089	....	
13,380	1,000	.0049	....	
669,000	50,000	.0214	....	
13,380	1,000	.0156	....	
13,380	1,000	....	.0151	
669,000	50,000	....	.0209	
13,380	1,000	....	.0159	
800,000	59,790	....	....	
13,380	1,000	....	.0316	
13,380	1,000	.0325	....	

There was local upsetting of the metal, and a longitudinal crack formed at the forward edge of the band, abreast the scarf joint of the band.

The longitudinal crack was confined to the sharp edge of the groove in the cast iron.

No. 9497.

3.2-INCH SHELL.

Diameter of shell in front of band, 3″.18.
Sectional area (approximate) in front of band, 5.87 square inches.
Point cut off, leaving remaining part of shell 8½″ long.
Diametrical expansion measured on two diameters: Diameter, A, ½″ in front of band, and B, 2½″ in front of band.

Applied loads.		Diametrical expansion.		Remarks.
		Diameters.		
Total.	Per square inch.	A.	B.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
5,870	1.000	0.	0.	Initial load.
117,400	20,000	.0010	....	
234,800	40,000	.0078	....	
293,500	50,000	.0184	....	
352,200	60,000	.0352	.0340	
5,870	1,000	.0300	.0289	
410,900	70,000	....	....	
5,870	1,000	.0531	....	
5,870	1,000	.0533	.0503	After 16 hours' rest.
469,600	80,000	....	....	
5,870	1,000	.0995	.0861	

Longitudinal cracks opened at front and rear edges of the band groove and in the vicinity of the scarf joint of the band.

Ends of band at the scarf joint made an offset with each other of ″.10.

Ultimate strength, 486,500 pounds = 82,880 pounds per square inch.

Sheared a conical piece at truncated end of shell and opened longitudinal cracks over the conical development.

Longitudinal cracks were opened in the shell in the vicinity of the scarf joint of the band.

No. 9498.

3.2-INCH SHELL.

Diameter of shell in front of band, 3''.17.

Sectional area (approximate) in front of band, 5.82 square inches.

Point cut off leaving remaining part of shell 8½'' long.

Diametrical expansion measured on two diameters: Diameter A, ½'' in front of band, and B, 2½'' in front of band.

Applied loads.		Diametrical expansion.		Remarks.
		Diameters.		
Total.	Per square inch.	A.	B.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
5,820	1,000	0.	0.	Initial load.
116,400	20,000	.0010	.0013	
5,820	1,000	.0004	.0002	
232,800	40,000	.0060	.0063	
291,000	50,000	.0152	.0160	
5,820	1,000	.0117	.0123	
349,200	60,000	.0287	.0288	
407,400	70,000	.0498	.0480	
5,820	1,000	.0430	.0416	
465,600	80,000	....	....	
5,820	1,000	.0708	.0664	
527,300	90,600	....	....	Ultimate strength.

Sheared a conical piece at the truncated end of the shell and opened longitudinal cracks over the conical development.

Longitudinal cracks were opened at each end of the scarf joint of the band.

No. 9499.

3.2-INCH SHELL.

Diameter of shell in front of band, 3″.175.

Sectional area (approximate) in front of band, 5.84 square inches.

Point cut off entirely removing ogival, leaving remaining part of shell 7″.3 long.

Diametrical expansion measured on two diameters: Diameter A, ½″ in front of band, and B, 2½″ in front of band.

Applied loads.		Diametrical expansion.		Remarks.
		Diameters.		
Total.	Per square inch.	A.	B.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
5,840	1,000	0.	0.	Initial load.
116,800	20,000	.0011	.0010	
5,840	1,000	.0001	.0000	
233,600	40,000	.0086	.0086	
5,840	1,000	.0058	.0061	
292,000	50,000	.0203	.0206	
5,840	1,000	.0164	.0171	
350,400	60,000	.0376	.0375	
408,800	70,000	.0631	.0625	
5,840	1,000	.0569	.0557	
467,200	80,000	....	....	
5,840	1,000	.1010	.0967	
517,400	88,600	....	....	Ultimate strength.

Longitudinal cracks opened on the surface of the shell abreast the ends of the scarf joint of the band, under a total load of 400,000 pounds.

After applying 80,000 pounds per square inch the shell was taken out of the testing machine and subjected to hydrostatic pressure from within.

The seams at the surface next the band were now about ¼″ long, one on each side of the scarf joint.

An interior pressure of 500 pounds per square inch was sustained with no evidence of the cracks extending through the walls to the bore, no leakage being visible.

Returned to the testing machine and loads increased until rupture occurred, when there was developed a conical shearing fracture at the base of the shell, and longitudinal cracks opened, extending along the shell from the base in a forward direction.

No. 9500.

3.2-INCH SHELL.

Diameter of shell in front of band, 3″.17.

Sectional area (approximate) in front of band, 5.82 square inches.

Point cut off entirely removing ogival, leaving remaining part of shell 7″.3 long.

Longitudinal compression measured on a gauged length of 2″, covering a section beginning ¼″ in front of the band and ending 2¼″ in front of same.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
5,820	1,000	0.	0.	Initial load.
29,100	5,000	.0004	0.	
58,200	10,000	.0011	.0001	
87,300	15,000	.0017	.0001	
116,400	20,000	.0025	.0002	
145,500	25,000	.0034	.0005	
174,600	30,000	.0046	.0012	
203,700	35,000	.0069	.0027	
232,800	40,000	.0106	.0057	
261,900	45,000	.0155	.0098	
291,000	50,000	.0219	.0153	
320,100	55,000	.0277	.0206	
550,600	94,600	....	....	Ultimate strength.

Shearing fractures developed at the base end of the shell, and opened longitudinal cracks in the same vicinity.

No. 9501.

3.2-INCH SHELL.

Diameter of shell in front of band, 3″.17.

Sectional area (approximate) in front of band, 5.82 square inches.

Point cut off entirely removing ogival, leaving remaining part of shell 7″.3 long.

Longitudinal compression measured on a gauged length of 3″, beginning at a point 1⅝″ from base of shell and covering that part of the shell carrying the band.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
5,820	1,000	0.	0.	Initial load.
29,100	5,000	.0007	.0001	
58,200	10,000	.0016	.0002	
87,300	15,000	.0027	.0003	
116,400	20,000	.0040	.0006	
145,500	25,000	.0056	.0012	
174,600	30,000	.0078	.0021	
203,700	35,000	.0112	.0045	
232,800	40,000	.0160	.0085	
261,900	45,000	.0246	.0158	
291,000	50,000	.0342	.0241	
320,100	55,000	.0460	.0349	
349,200	60,000	.0612	.0485	
522,000	94,850	....	....	Ultimate strength.

Shell failed by the development of oblique cracks separating three fragments, one piece at the base and two pieces of the sides of the shell.

No. 9502.

SHELL FOR 5-INCH R. F. GUN.

Diameter of shell in front of band, 4″.97.

Sectional area (approximate) in front of band, 13.42 square inches.

Point cut off, leaving remaining part of shell 12″ long.

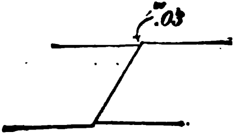
Longitudinal compression measured on a gauged length of 4″, beginning ½″ in front of band.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
13,420	1,000	0.	0.	Initial load.
67,100	5,000	.0009	.0001	
134,200	10,000	.0022	.0002	
201,300	15,000	.0037	.0004	
268,400	20,000	.0056	.0008	
335,500	25,000	.0082	.0018	
402,600	30,000	.0122	.0043	
469,700	35,000	.0187	.0097	
536,800	40,000	.0302	.0193	
603,900	45,000	.0461	.0339	
671,000	50,000	.0661	.0527	
738,100	55,000	.0898	.0735	
800,000	59,610	....	.09	Test discontinued.

Diameter immediately in front of band, 5″.02+.

Diameter 2″ forward of band, 5″.03.

Offset ends of band,



No. 9503.

SHELL FOR 5-INCH R. F. GUN.

Diameter of shell in front of band, 4″.97.
Sectional area (approximate) in front of band, 13.42 square inches.
Point cut off, leaving remaining part of shell 12″ long.
Longitudinal compression measured on a gauged length of 4″, beginning ½″ in front of band.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
13, 420	1, 000	0.	0.	Initial load.
67, 100	5, 000	.0010	0.	
134, 200	10, 000	.0023	.0002	
201, 300	15, 000	.0039	.0004	
268, 400	20, 000	.0059	.0010	
235, 500	25, 000	.0088	.0022	
402, 600	30, 000	.0134	.0054	
469, 700	35, 000	.0227	.0133	
536, 800	40, 000	.0400	.0290	
603, 900	45, 000	.0657	.0536	Copper band takes offset at ends.
671. 000	50, 000	.0991	.0853	
738, 100	55, 000	....	.12	
800, 000	59, 610	....	.17	Test discontinued.

Diameter immediately in front of band, 5″.08.
Diameter 2″ forward of band, 5″.07.
Cracks started in the shell abreast ends of scarf joint of band.
Offset ends of band, ″.05.

No. 9504.

SHELL FOR 5-INCH R. F. GUN.

Diameter of shell in front of band, 4″.97.

Sectional area (approximate) in front of band, 13.42 square inches.

Point cut off, leaving remaining part of shell 12″ long.

Longitudinal compression measured on a gauged length of 4″, beginning ½″ in front of band.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
13,420	1,000	0.	0.	Initial load.
67,100	5,000	.0009	0.	
134,200	10,000	.0020	.0001	
201,300	15,000	.0035	.0002	
268,400	20,000	.0050	.0005	
235,500	25,000	.0071	.0012	
402,600	30,000	.0099	.0025	
469,700	35,000	.0145	.0057	
536,800	40,000	.0220	.0118	
603,900	45,000	.0342	.0227	
671,000	50,000	.0496	.0368	
738,100	55,000	.0689	.0545	
800,000	59,610	.0883	.0727	Test discontinued.

Diameter immediately in front of band, 5″.01.

Diameter 2″ forward of band, 5″.00.

Offset ends of band, ″.02.

CAST IRON

FOR

GUN AND MORTAR CARRIAGES.

TOP CARRIAGE CASTING.

No. 5732.

Marks, T C 36.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00011	.00005	....	....	
4,000	4,000	.00017	.00006	....	....	
5,000	5,000	.00023	.00006	....	....	
6,000	6,000	.00030	.00007	....	....	
7,000	7,000	.00037	.00007	....	....	
8,000	8,000	.00043	.00006	....	....	
9,000	9,000	.00051	.00008	....	....	
10,000	10,000	.00059	.00008	.00002	.00002	
11,000	11,000	.00068	.00009	....	....	
12,000	12,000	.00077	.00009	....	....	
13,000	13,000	.00085	.00008	....	....	
14,000	14,000	.00095	.00010	....	....	
15,000	15,000	.00107	.00012	.00012	.00010	
16,000	16,000	.00119	.00012	....	....	
17,000	17,000	.00130	.00011	....	....	
18,000	18,000	.00144	.00014	....	....	
19,000	19,000	.00159	.00015	....	....	
20,000	20,000	.00177	.00018	.00038	.00026	
21,000	21,000	.00200	.00023	....	....	
22,000	22,000	.00220	.00020	....	....	
23,000	23,000	.00248	.00028	....	....	
24,000	24,000	.00281	.00033	....	....	
25,000	25,000	.00325	.00044	.00124	.00086	
26,110	26,110	....	....	....	....	Tensile strength.

Fractured 1″ from neck. Appearance granular, light gray mottled.

UPPER BASE RING CASTING.

No. 5733.

Marks, U B R 36.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	....	....	
3,000	3,000	.00012	.00007	....	....	
4,000	4,000	.00017	.00005	....	....	
5,000	5,000	.00023	.00006	....	....	
6,000	6,000	.00029	.00006	....	....	
7,000	7,000	.00036	.00007	....	....	
8,000	8,000	.00042	.00006	....	....	
9,000	9,000	.00050	.00008	....	....	
10,000	10,000	.00058	.00008	.00002	.00002	
11,000	11,000	.00065	.00007	....	....	
12,000	12,000	.00074	.00009	....	....	
13,000	13,000	.00082	.00008	....	....	
14,000	14,000	.00091	.00009	....	....	
15,000	15,000	.00100	.00009	.00007	.00005	
16,000	16,000	.00109	.00009	....	....	
17,000	17,000	.00119	.00010	....	....	
18,000	18,000	.00129	.00010	....	....	
19,000	19,000	.00140	.00011	....	....	
20,000	20,000	.00152	.00012	.00020	.00018	
21,000	21,000	.00167	.00015	....	....	
22,000	22,000	.00180	.00013	....	....	
23,000	23,000	.00194	.00014	....	....	
24,000	24,000	.00213	.00019	....	....	
25,000	25,000	.00232	.00019	.00052	.00032	
32,300	32,300	....	....	....	....	Tensile strength.

Fractured 3″.9 from neck. Appearance, granular, light gray, mottled.

TOP CARRIAGE.

No. 5743.

Marks, P T C 34.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00011	.00005	....	....	
4,000	4,000	.00018	.00007	....	....	
5,000	5,000	.00023	.00005	....	....	
6,000	6,000	.00029	.00006	....	....	
7,000	7,000	.00036	.00007	....	....	
8,000	8,000	.00042	.00006	....	....	
9,000	9,000	.00049	.00007	....	....	
10,000	10,000	.00056	.00007	.00008	.00008	
11,000	11,000	.00062	.00006	....	....	
12,000	12,000	.00070	.00008	....	....	
13,000	13,000	.00078	.00008	....	....	
14,000	14,000	.00086	.00008	....	....	
15,000	15,000	.00094	.00008	.00006	.00003	
16,000	16,000	.00101	.00007	....	....	
17,000	17,000	.00110	.00009	....	....	
18,000	18,000	.00119	.00009	....	....	
19,000	19,000	.00129	.00010	....	....	
20,000	20,000	.00139	.00010	.00014	.00008	
21,000	21,000	.00150	.00011	....	....	
22,000	22,000	.00160	.00010	....	....	
23,000	23,000	.00172	.00012	....	....	
24,000	24.000	.00188	.00016	....	....	
25,000	25,000	.00202	.00014	.00035	.00021	
26,000	26,000	.00222	.00020	....	....	
27,000	27,000	.00241	.00019	....	....	
28,000	28,000	.00269	.00028	.00069	.00034	
29,000	29,020	....	....	....	....	Tensile strength.

Fractured 1.″3 from neck. Appearance, granular, light gray, mottled.

TOP CARRIAGE.

No. 5744.

Marks, P T C 34.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	....	....	
3,000	3,000	.00011	.00004	....	....	
4,000	4,000	.00017	.00006	....	....	
5,000	5,000	.00023	.00006	....	....	
6,000	6,000	.00029	.00006	....	....	
7,000	7,000	.00036	.00007	....	....	
8,000	8,000	.00041	.00005	....	....	
9,000	9,000	.00049	.00008	....	....	
10,000	10,000	.00055	.00006	.00002	.00002	
11,000	11,000	.00061	.00006	....	....	
12,000	12,000	.00069	.00008	....	....	
13,000	13,000	.00077	.00008	....	....	
14,000	14,000	.00084	.00007	....	....	
15,000	15,000	.00092	.00008	.00005	.00003	
16,000	16,000	.00100	.00008	....	....	
17,000	17,000	.00109	.00009	....	....	
18,000	18,000	.00118	.00009	....	....	
19,000	19,000	.00128	.00010	....	....	
20,000	20,000	.00138	.00010	.00012	.00007	
21,000	21,000	.00149	.00011	....	....	
22,000	22,000	.00160	.00011	....	....	
23,000	23,000	.00172	.00012	....	....	
24,000	24,000	.00188	.00016	....	....	
25,000	25,000	.00205	.00017	.00036	.00024	
27,820	27,820	....	....	....	....	Tensile strength.

Fractured 1″.1 from neck. Appearance, granular, light gray, mottled.

TOP CARRIAGE.

No. 5722.

Marks, P T C 35.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00011	.00005	....	....	
4,000	4,000	.00018	.00007	....	....	
5,000	5,000	.00022	.00004	.00001	.00001	
6,000	6,000	.00028	.00006	....	....	
7,000	7,000	.00034	.00006	....	....	
8,000	8,000	.00041	.00007	....	....	
9,000	9,000	.00047	.00006	....	....	
10,000	10,000	.00053	.00006	.00003	.00002	
11,000	11,000	.00061	.00008	....	....	
12,000	12,000	.00068	.00007	....	....	
13,000	13,000	.00076	.00008	....	....	
14,000	14,000	.00084	.00008	....	....	
15,000	15,000	.00092	.00008	.00010	.00007	
16,000	16,000	.00102	.00010	....	....	
17,000	17,000	.00110	.00008	....	....	
18,000	18,000	.00121	.00011	....	....	
19,000	19,000	.00131	.00010	....	....	
20,000	20,000	.00143	.00012	.00024	.00014	
21,000	21,000	.00156	.00013	....	....	
22,000	22,000	.00170	.00014	....	....	
23,000	23,000	.00184	.00014	....	....	
24,000	24,000	.00200	.00016	....	....	
25,000	25,000	.00221	.00021	.00060	.00036	
26,000	26,000	.00243	.00022	....	....	
27,000	27,000	.00266	.00023	....	....	
28,000	28,000	.00295	.00029	.00108	.00048	
28,420	28,420	....	....	....	....	Tensile strength.

Fractured ''.85 from neck. Appearance, fine granular, light gray, mottled. Fractured surface contains a spot of smooth, lustrous metal ''.18 × ''.30.

TOP CARRIAGE.

No. 5742.

Marks, P T C 38.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	....	....	
3,000	3,000	.00013	.00006	....	....	
4,000	4,000	.00019	.00006	....	....	
5,000	5,000	.00024	.00005	....	....	
6,000	6,000	.00031	.00007	....	....	
7,000	7,000	.00038	.00007	....	....	
8,000	8,000	.00044	.00006	....	....	
9,000	9,000	.00051	.00007	....	....	
10,000	10,000	.00059	.00008	.00005	.00005	
11,000	11,000	.00067	.00008	....	....	
12,000	12,000	.00074	.00007	....	....	
13,000	13,000	.00083	.00009	....	....	
14,000	14,000	.00092	.00009	....	....	
15,000	15,000	.00102	.00010	.00012	.00007	
16,000	16,000	.00114	.00012	....	....	
17,000	17,000	.00124	.00010	....	....	
18,000	18,000	.00137	.00013	....	....	
19,000	19,000	.00151	.00014	....	....	
20,000	20,000	.00166	.00015	.00033	.00021	
21,000	21,000	.00183	.00017	....	....	
22,000	22,000	.00200	.00017	....	....	
23,000	23,000	.00221	.00021	....	....	
24,000	24,000	.00242	.00021	....	....	
25,000	25,000	.00271	.00029	.00090	.00057	
31,140	31,140	....	....	....	....	Tensile strength.

Fractured ''.5 from neck. Appearance, granular, gray.

TOP CARRIAGE.

No. 5748.

Marks, T C 40.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00012	.00006	....	....	
4,000	4,000	.00018	.00006	....	....	
5,000	5,000	.00024	.00006	....	....	
6,000	6,000	.00030	.00006	....	....	
7,000	7,000	.00038	.00008	....	....	
8,000	8,000	.00045	.00007	....	....	
9,000	9,000	.00052	.00007	....	....	
10,000	10,000	.00061	.00009	.00004	.00004	
11,000	11,000	.00070	.00009	....	....	
12,000	12,000	.00082	.00012	....	....	
13,000	13,000	.00092	.00010	....	....	
14,000	14,000	.00103	.00011	....	....	
15,000	15,000	.00118	.00015	.00022	.00018	
16,000	16,000	.00134	.00016	....	....	
17,000	17,000	.00150	.00016	....	....	
18,000	18,000	.00173	.00023	....	....	
19,000	19,000	.00198	.00025	....	....	
20,000	20,000	.00227	.00029	.00084	.00062	
21,000	21,000	.00266	.00039	....	....	
22,000	22,000	.00312	.00046	....	....	
23,000	23,000	.00377	.00065	....	....	
24,000	24,000	.00460	.00083	....	....	
24,980	24,980	....	....	....	....	Tensile strength.

Fractured 1''.3 from neck. Appearance, fine granular, gray.

TOP CARRIAGE.

No. 5755.

Marks, T C 45.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007			
3,000	3,000	.00014	.00007			
4,000	4,000	.00021	.00007			
5,000	5,000	.00027	.00006			
6,000	6,000	.00034	.00007			
7,000	7,000	.00042	.00008			
8,000	8,000	.00050	.00008			
9,000	9,000	.00059	.00009			
10,000	10,000	.00067	.00008	.00008	.00008	
11,000	11,000	.00076	.00009			
12,000	12,000	.00086	.00010			
13,000	13,000	.00097	.00011			
14,000	14,000	.00109	.00012			
15,000	15,000	.00123	.00014	.00024	.00016	
16,000	16,000	.00140	.00017			
17,000	17,000	.00158	.00018			
18,000	18,000	.00179	.00021			
19,000	19,000	.00210	.00031			
20,000	20,000	.00242	.00032	.00096	.00072	
21,000	21,000	.00285	.00043			
22,000	22,000	.00340	.00055			
23,000	23,000	.00400	.00060			
24,000	24,000	.00480	.00080			
24,900	24,900					Tensile strength.

Fractured at the neck. Appearance, fine granular, dark gray.

TOP CARRIAGE.

No. 5794.

Marks, T C 56.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	....	....	
3,000	3,000	.00012	.00007	....	....	
4,000	4,000	.00019	.00007	....	....	
5,000	5,000	.00025	.00006	....	....	
6,000	6,000	.00032	.00007	....	....	
7,000	7,000	.00040	.00008	....	....	
8,000	8,000	.00049	.00009	....	....	
9,000	9,000	.00057	.00008	....	....	
10,000	10,000	.00064	.00007	.00004	.00004	
11,000	11,000	.00073	.00009	....	....	
12,000	12,000	.00083	.00010	....	....	
13,000	13,000	.00095	.00012	....	....	
14,000	14,000	.00107	.00012	....	....	
15,000	15,000	.00119	.00012	.00017	.00013	
16,000	16,000	.00131	.00012	....	....	
17,000	17,000	.00148	.00017	....	....	
18,000	18,000	.00164	.00016	....	....	
19,000	19,000	.00183	.00019	....	....	
20,000	20,000	.00208	.00025	.00060	.00043	
21,000	21,000	.00236	.00028	....	....	
22,000	22,000	.00264	.00028	....	....	
23,000	23,000	.00304	.00040	....	....	
24,000	24,000	.00351	.00047	....	....	
25,000	25,000	.00407	.00056	.00199	.00139	
29,310	29,310	....	....	....	....	Tensile strength.

Fractured 1″.2 from neck. Appearance, granular, gray.

Marks [illegible]
Diameter [illegible]
Sectional area [illegible]
Length of stem [illegible]
Gauged length [illegible]

Applied loads		Elongation [illegible]	[illegible]	Permanent set	[illegible]	Remarks
Tons.	Per square inch.					
Pounds.	Pounds.	Inch.	Inch.	Inch.	Inch.	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	-	-	
[illegible]	[illegible]	[illegible]	[illegible]	-	-	
[illegible]	[illegible]	[illegible]	[illegible]	-	-	
[illegible]	[illegible]	[illegible]	[illegible]	-	-	
[illegible]	[illegible]	[illegible]	[illegible]	-	-	
[illegible]	[illegible]	[illegible]	[illegible]	-	-	
[illegible]	[illegible]	[illegible]	[illegible]	-	-	
[illegible]	[illegible]	[illegible]	[illegible]	-	-	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	-	-	
[illegible]	[illegible]	[illegible]	[illegible]	-	-	
[illegible]	[illegible]	[illegible]	[illegible]	-	-	
[illegible]	[illegible]	[illegible]	[illegible]	-	-	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	-	-	
[illegible]	[illegible]	[illegible]	[illegible]	-	-	
[illegible]	[illegible]	[illegible]	[illegible]	-	-	
[illegible]	[illegible]	[illegible]	[illegible]	-	-	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	-	-	
[illegible]	[illegible]	[illegible]	[illegible]	-	-	
[illegible]	[illegible]	[illegible]	[illegible]	-	-	
[illegible]	[illegible]	[illegible]	[illegible]	-	-	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	-	-	-	-	Tensile strength.

Fractured [illegible] from neck. Appearance, granular, gray.

Top Carriage.

No. 5811.

CHARCOAL IRON.

Marks, T C 58.
Diameter, ″.564.
Sectional area, .25 square inch.
Length of stem, 3″.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000267	.000267	0.	....	
2,500	10,000	.000633	.000366	....	....	
3,750	15,000	.001067	.000434	....	....	
5,000	20,000	.001900	.000833	.000467	.000467	
5,250	21,000	.002100	.000200	....	....	
5,500	22,000	.002367	.000267	....	....	
5,750	23,000	.002733	.000366	....	....	
6,000	24,000	.003100	.000367	....	....	
6,250	25,000	.003567	.000467	.001500	.001033	
6,500	26,000	.004200	.000633	....	....	
6,750	27,000	.004633	.000433	....	....	
7,000	28,000	.005500	.000867	....	....	
7,250	29,000	.006233	.000733	....	....	
7,500	30,000	.007333	.001100	.004667	.003167	
7,700	30,800	....	....	....	....	Tensile strength.

Fractured ″.35 from neck. Appearance, fine granular.

TOP CARRIAGE.

No. 5809.

Marks, T C 58.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	....	....	
3,000	3,000	.00012	.00007	....	....	
4,000	4,000	.00018	.00006	....	....	
5,000	5,000	.00025	.00007	....	....	
6,000	6,000	.00032	.00007	....	....	
7,000	7,000	.00041	.00009	....	....	
8,000	8,000	.00049	.00008	....	....	
9,000	9,000	.00057	.00008	....	....	
10,000	10,000	.00064	.00007	.00003	.00003	
11,000	11,000	.00073	.00009	....	....	
12,000	12,000	.00084	.00011	....	....	
13,000	13,000	.00095	.00011	....	....	
14,000	14,000	.00107	.00012	....	....	
15,000	15,000	.00121	.00014	.00020	.00017	
16,000	16,000	.00135	.00014	....	....	
17,000	17,000	.00154	.00019	....	....	
18,000	18,000	.00174	.00020	....	....	
19,000	19,000	.00199	.00025	....	....	
20,000	20,000	.00231	.00032	.00080	.00060	
21,000	21,000	.00265	.00034	....	....	
22,000	22,000	.00305	.00040	....	....	
23,000	23,000	.00360	.00055	....	....	
24,000	24,000	.00426	.00066	....	....	
25,000	25,000	.00505	.00079	.00295	.00215	
27,220	27,220	....	....	....	....	Tensile strength.

Fractured ″.8 from neck. Appearance, granular, gray.

TOP CARRIAGE.

No. 5811.

CHARCOAL IRON.

Marks, T C 58.
Diameter, ″.564.
Sectional area, .25 square inch.
Length of stem, 3″.
Gauged length, 3″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
1,250	5,000	.000267	.000267	0.	....	
2,500	10,000	.000633	.000366	....	....	
3,750	15,000	.001067	.000434	....	....	
5,000	20,000	.001900	.000833	.000467	.000467	
5,250	21,000	.002100	.000200	....	....	
5,500	22,000	.002367	.000267	....	....	
5,750	23,000	.002733	.000366	....	....	
6,000	24,000	.003100	.000367	....	....	
6,250	25,000	.003567	.000467	.001500	.001033	
6,500	26,000	.004200	.000633	....	....	
6,750	27,000	.004633	.000433	....	....	
7,000	28,000	.005500	.000867	....	....	
7,250	29,000	.006233	.000733	....	....	
7,500	30,000	.007333	.001100	.004667	.003167	
7,700	30,800	....	....	....	....	Tensile strength.

Fractured ″.35 from neck. Appearance, fine granular.

TOP CARRIAGE.

No. 5866.

Marks, T C 75.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	....	....	
3,000	3,000	.00013	.00006	....	....	
4,000	4,000	.00019	.00006	....	....	
5,000	5,000	.00025	.00006	....	....	
6,000	6,000	.00030	.00005	....	....	
7,000	7,000	.00039	.00009	....	....	
8,000	8,000	.00044	.00005	....	....	
9,000	9,000	.00051	.00007	....	....	
10,000	10,000	.00060	.00009	.00006	.00006	
11,000	11,000	.00066	.00006	....	....	
12,000	12,000	.00074	.00008	....	....	
13,000	13,000	.00083	.00009	....	....	
14,000	14,000	.00092	.00009	....	....	
15,000	15,000	.00101	.00009	.00013	.00007	
16,000	16,000	.00110	.00009	....	....	
17,000	17,000	.00121	.00011	....	....	
18,000	18,000	.00132	.00011	....	....	
19,000	19,000	.00145	.00013	....	....	
20,000	20,000	.00158	.00013	.00030	.00017	
21,000	21,000	.00172	.00014	....	....	
22,000	22,000	.00189	.00017	....	....	
23,000	23,000	.00206	.00017	....	....	
24,000	24,000	.00226	.00020	....	....	
25,000	25,000	.00252	.00026	.00082	.00052	
33,090	33,090	....	....	....	....	Tensile strength.

Fractured 3'' from neck. Appearance, fine granular, light gray.

TOP CARRIAGE.

No. 5871.

Marks, T C 78.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00011	.00005	....	....	
4,000	4,000	.00017	.00006	....	....	
5,000	5,000	.00023	.00006	0.	....	
6,000	6,000	.00030	.00007	....	....	
7,000	7,000	.00037	.00007	....	....	
8,000	8,000	.00043	.00006	....	....	
9,000	9,000	.00051	.00008	....	....	
10,000	10,000	.00059	.00008	.00003	.00003	
11,000	11,000	.00067	.00008	....	....	
12,000	12,000	.00076	.00009	....	....	
13,000	13,000	.00084	.00008	....	....	
14,000	14,000	.00092	.00008	....	....	
15,000	15,000	.00101	.00009	.00010	.00007	
16,000	16,000	.00111	.00010	....	....	
17,000	17,000	.00122	.00011	....	....	
18,000	18,000	.00135	.00013	....	....	
19,000	19,000	.00147	.00012	....	....	
20,000	20,000	.00160	.00013	.00029	.00019	
21,000	21,000	.00176	.00016	....	....	
22,000	22,000	.00192	.00016	....	....	
23,000	23,000	.00211	.00019	....	....	
24,000	24,000	.00238	.00027	....	....	
25,000	25,000	.00260	.00022	.00080	.00051	
32,800	32,800	....	....	....	....	Tensile strength.

Fractured at the neck. Appearance, fine granular, gray.

TOP CARRIAGE.

No. 5889.

Marks, T C 82.
Diameter, 1".129.
Sectional area, 1.00 square inch.
Length of stem, 10".
Gauged length, 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	....	....	
3,000	3,000	.00013	.00006	....	....	
4,000	4,000	.00019	.00006	....	....	
5,000	5,000	.00026	.00007	.00001	.00001	
6,000	6,000	.00033	.00007	....	....	
7,000	7,000	.00040	.00007	....	....	
8,000	8,000	.00049	.00009	....	....	
9,000	9,000	.00056	.00007	....	....	
10,000	10,000	.00063	.00007	.00006	.00005	
11,000	11,000	.00072	.00009	....	....	
12,000	12,000	.00081	.00009	....	....	
13,000	13,000	.00091	.00010	....	....	
14,000	14,000	.00103	.00012	....	....	
15,000	15,000	.00118	.00015	.00021	.00015	
16,000	16,000	.00130	.00012	....	....	
17,000	17,000	.00147	.00017	....	....	
18,000	18,000	.00168	.00021	....	....	
19,000	19,000	.00185	.00017	....	....	
20,000	20,000	.00212	.00027	.00073	.00052	
21,000	21,000	.00240	.00028	....	....	
22,000	22,000	.00273	.00033	....	....	
23,000	23,000	.00311	.00038	....	....	
24,000	24,000	.00360	.00049	....	....	
25,000	25,000	.00425	.00065	.00233	.00160	
28,720	28,720	....	....	....	....	Tensile strength.

Fractured at the neck. Appearance, fine granular, gray.

TOP CARRIAGE.

No. 5898.

Marks, T C 89.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Guaged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	....	....	
3,000	3,000	.00012	.00005	....	....	
4,000	4,000	.00018	.00006	....	....	
5,000	5,000	.00023	.00005	....	....	
6,000	6,000	.00029	.00006	....	....	
7,000	7,000	.00035	.00006	....	....	
8,000	8,000	.00041	.00006	....	....	
9,000	9,000	.00049	.00008	....	....	
10,000	10,000	.00056	.00007	.00004	.00004	
11,000	11,000	.00063	.00007	....	....	
12,000	12,000	.00071	.00008	....	....	
13,000	13,000	.00080	.00009	....	....	
14,000	14,000	.00089	.00009	....	....	
15,000	15,000	.00100	.00011	.00011	.00007	
16,000	16,000	.00110	.00010	....	....	
17,000	17,000	.00120	.00010	....	....	
18,000	18,000	.00133	.00013	....	....	
19,000	19,000	.00148	.00015	....	....	
20,000	20,000	.00162	.00014	.00039	.00028	
21,000	21,000	.00182	.00020	....	....	
22,000	22,000	.00206	.00024	....	....	
23,000	23,000	.00228	.00022	....	....	
24,000	24,000	.00260	.00032	....	....	
25,000	25,000	.00298	.00038	.00122	.00083	
32,780	32,780	....	....	....	....	Tensile strength.

Fractured 1″ from neck. Appearance, granular, gray.

TOP CARRIAGE.

No. 5910.

Marks, T C 93.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	....	....	
3,000	3,000	.00013	.00006	....	....	
4,000	4,000	.00020	.00007	....	....	
5,000	5,000	.00028	.00008	....	....	
6,000	6,000	.00035	.00007	....	....	
7,000	7,000	.00041	.00006	....	....	
8,000	8,000	.00050	.00009	....	....	
9,000	9,000	.00059	.00009	....	....	
10,000	10,000	.00067	.00008	.00008	.00008	
11,000	11,000	.00077	.00010	....	....	
12,000	12,000	.00086	.00009	....	....	
13,000	13,000	.00097	.00011	....	....	
14,000	14,000	.00108	.00011	....	....	
15,000	15,000	.00120	.00012	.00021	.00013	
16,000	16,000	.00136	.00016	....	....	
17,000	17,000	.00152	.00016	....	....	
18,000	18,000	.00170	.00018	....	....	
19,000	19,000	.00195	.00025	....	....	
20,000	20,000	.00221	.00026	.00079	.00058	
21,000	21,000	.00261	.00040	....	....	Tensile strength.

Fractured 2″ from neck. Appearance, granular, gray, spongy spot at place of fracture.

CHASSIS.

No. 5834.

Marks, O H 61.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1, 000	1, 000	0.	0.	0.	0.	Initial load.
2, 000	2, 000	.00007	.00007	....	....	
3, 000	3, 000	.00013	.00006	....	....	
4, 000	4, 000	.00020	.00007	....	....	
5, 000	5, 000	.00028	.00008	....	....	
6, 000	6, 000	.00035	.00007	....	....	
7, 000	7, 000	.00042	.00007	....	....	
8, 000	8, 000	.00050	.00008	....	....	
9, 000	9, 000	.00058	.00008	....	....	
10, 000	10, 000	.00068	.00010	.00007	.00007	
11, 000	11, 000	.00075	.00007	....	....	
12, 000	12, 000	.00084	.00009	....	....	
13, 000	13, 000	.00093	.00009	....	....	
14, 000	14, 000	.00103	.00010	....	....	
15, 000	15, 000	.00115	.00012	.00018	.00011	
16, 000	16, 000	.00128	.00013	....	....	
17, 000	17, 000	.00140	.00012	....	....	
18, 000	18, 000	.00153	.00013	....	....	
19, 000	19, 000	.00169	.00016	....	....	
20, 000	20, 000	.00188	.00019	.00043	.00025	
21, 000	21, 000	.00210	.00022	....	....	
22, 000	22, 000	.00232	.00022	....	....	
23, 000	23, 000	.00255	.00023	....	....	
24, 000	24, 000	.00282	.00027	....	....	
25, 000	25, 000	.00325	.00043	.00181	.00088	
31, 240	31, 240	....	....	....	....	Tensile strength.

Fractured at the neck. Appearance, fine granular, gray.

TOP CARRIAGE.

No. 5910.

Marks, T C 93.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	....	....	
3,000	3,000	.00013	.00006	....	....	
4,000	4,000	.00020	.00007	....	....	
5,000	5,000	.00028	.00008	....	....	
6,000	6,000	.00035	.00007	....	....	
7,000	7,000	.00041	.00006	....	....	
8,000	8,000	.00050	.00009	....	....	
9,000	9,000	.00059	.00009	....	....	
10,000	10,000	.00067	.00008	.00008	.00008	
11,000	11,000	.00077	.00010	....	....	
12,000	12,000	.00086	.00009	....	....	
13,000	13,000	.00097	.00011	....	....	
14,000	14,000	.00108	.00011	....	....	
15,000	15,000	.00120	.00012	.00021	.00013	
16,000	16,000	.00136	.00016	....	....	
17,000	17,000	.00152	.00016	....	....	
18,000	18,000	.00170	.00018	....	....	
19,000	19,000	.00195	.00025	....	....	
20,000	20,000	.00221	.00026	.00079	.00058	
21,000	21,000	.00261	.00040	....	....	Tensile strength.

Fractured 2″ from neck. Appearance, granular, gray, spongy spot at place of fracture.

CHASSIS.

No. 5834.

Marks, O H 61.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007			
3,000	3,000	.00013	.00006			
4,000	4,000	.00020	.00007			
5,000	5,000	.00028	.00008			
6,000	6,000	.00035	.00007			
7,000	7,000	.00042	.00007			
8,000	8,000	.00050	.00008			
9,000	9,000	.00058	.00008			
10,000	10,000	.00068	.00010	.00007	.00007	
11,000	11,000	.00075	.00007			
12,000	12,000	.00084	.00009			
13,000	13,000	.00093	.00009			
14,000	14,000	.00103	.00010			
15,000	15,000	.00115	.00012	.00018	.00011	
16,000	16,000	.00128	.00013			
17,000	17,000	.00140	.00012			
18,000	18,000	.00153	.00013			
19,000	19,000	.00169	.00016			
20,000	20,000	.00188	.00019	.00043	.00025	
21,000	21,000	.00210	.00022			
22,000	22,000	.00232	.00022			
23,000	23,000	.00255	.00023			
24,000	24,000	.00282	.00027			
25,000	25,000	.00325	.00043	.00131	.00088	
31,240	31,240					Tensile strength.

Fractured at the neck. Appearance, fine granular, gray.

TOP CARRIAGE.

No. 5910.

Marks, T C 93.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	....	....	
3,000	3,000	.00013	.00006	....	....	
4,000	4,000	.00020	.00007	....	....	
5,000	5,000	.00028	.00008	....	....	
6,000	6,000	.00035	.00007	....	....	
7,000	7,000	.00041	.00006	....	....	
8,000	8,000	.00050	.00009	....	....	
9,000	9,000	.00059	.00009	....	....	
10,000	10,000	.00067	.00008	.00008	.00008	
11,000	11,000	.00077	.00010	....	....	
12,000	12,000	.00086	.00009	....	....	
13,000	13,000	.00097	.00011	....	....	
14,000	14,000	.00108	.00011	....	....	
15,000	15,000	.00120	.00012	.00021	.00013	
16,000	16,000	.00136	.00016	....	....	
17,000	17,000	.00152	.00016	....	....	
18,000	18,000	.00170	.00018	....	....	
19,000	19,000	.00195	.00025	....	....	
20,000	20,000	.00221	.00026	.00079	.00058	
21,000	21,000	.00261	.00040	....	....	Tensile strength.

Fractured 2″ from neck. Appearance, granular, gray, spongy spot at place of fracture.

CHASSIS.

No. 5834.

Marks, O H 61.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	....	....	
3,000	3,000	.00013	.00006	....	....	
4,000	4,000	.00020	.00007	....	....	
5,000	5,000	.00028	.00008	....	....	
6,000	6,000	.00035	.00007	....	....	
7,000	7,000	.00042	.00007	....	....	
8,000	8,000	.00050	.00008	....	....	
9,000	9,000	.00058	.00008	....	....	
10,000	10,000	.00068	.00010	.00007	.00007	
11,000	11,000	.00075	.00007	....	....	
12,000	12,000	.00084	.00009	....	....	
13,000	13,000	.00093	.00009	....	....	
14,000	14,000	.00103	.00010	....	....	
15,000	15,000	.00115	.00012	.00018	.00011	
16,000	16,000	.00128	.00013	....	....	
17,000	17,000	.00140	.00012	....	....	
18,000	18,000	.00153	.00013	....	....	
19,000	19,000	.00169	.00016	....	....	
20,000	20,000	.00188	.00019	.00043	.00025	
21,000	21,000	.00210	.00022	....	....	
22,000	22,000	.00232	.00022	....	....	
23,000	23,000	.00255	.00023	....	....	
24,000	24,000	.00282	.00027	....	....	
25,000	25,000	.00325	.00043	.00131	.00088	
31,240	31,240	....	....	....	....	Tensile strength.

Fractured at the neck. Appearance, fine granular, gray.

CHASSIS.

No. 5870.

Marks, C H 77.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	.0	Initial load.
2,000	2,000	.00007	.00007	....	....	
3,000	3,000	.00014	.00007	....	....	
4,000	4,000	.00021	.00007	....	....	
5,000	5,000	.00030	.00009	....	....	
6,000	6,000	.00039	.00009	....	....	
7,000	7,000	.00049	.00010	....	....	
8,000	8,000	.00058	.00009	....	....	
9,000	9,000	.00068	.00010	....	....	
10,000	10,000	.00079	.00011	.00011	.00011	
11,000	11,000	.00091	.00012	....	....	
12,000	12,000	.00104	.00013	....	....	
13,000	13,000	.00119	.00015	....	....	
14,000	14,000	.00134	.00015	....	....	
15,000	15,000	.00154	.00020	.00038	.00027	
16,000	16,000	.00171	.00017	....	....	
17,000	17,000	.00196	.00025	....	....	
18,000	18,000	.00238	.00042	....	....	
19,000	19,000	.00264	.00026	....	....	
20,000	20,000	.00300	.00036	.00126	.00088	
21,000	21,000	.00364	.00064	....	....	
22,000	22,000	.00437	.00073	....	....	
23,000	23,000	.00523	.00086	....	....	
23,310	23,310	....	....	....	....	Tensile strength.

Fractured at middle of stem. Appearance, granular, gray.

CHASSIS.

No. 5880.

Marks, C H 79.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	....	....	
3,000	3,000	.00012	.00005	....	....	
4,000	4,000	.00018	.00006	....	....	
5,000	5,000	.00024	.00006	....	....	
6,000	6,000	.00030	.00006	....	....	
7,000	7,000	.00037	.00007	....	....	
8,000	8,000	.00043	.00006	....	....	
9,000	9,000	.00050	.00007	....	....	
10,000	10,000	.00058	.00008	.00004	.00004	
11,000	11,000	.00066	.00008	....	....	
12,000	12,000	.00074	.00008	....	....	
13,000	13,000	.00083	.00009	....	....	
14,000	14,000	.00091	.00008	....	....	
15,000	15,000	.00101	.00010	.00014	.00010	
16,000	16,000	.00111	.00010	....	....	
17,000	17,000	.00123	.00012	....	....	
18,000	18,000	.00136	.00013	....	....	
19,000	19,000	.00149	.00013	....	....	
20,000	20,000	.00165	.00016	.00038	.00024	
21,000	21,000	.00182	.00017	....	....	
22,000	22,000	.00200	.00018	....	....	
23,000	23,000	.00224	.00024	....	....	
24,000	24,000	.00250	.00026	....	....	
25,000	25,000	.00289	.00039	.00117	.00079	
32,580	32,580	....	....	....	....	Tensile strength.

Fractured at the neck. Appearance, fine granular, light gray.

CHASSIS.

No. 5887.

Marks, C H 80.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00012	.00006	....	....	
4,000	4,000	.00018	.00006	....	....	
5,000	5,000	.00024	.00006	....	....	
6,000	6,000	.00030	.00006	....	....	
7,000	7,000	.00038	.00008	....	....	
8,000	8,000	.00046	.00008	....	....	
9,000	9,000	.00053	.00007	....	....	
10,000	10,000	.00060	.00007	.00003	.00003	
11,000	11,000	.00068	.00008	....	....	
12,000	12,000	.00078	.00010	....	....	
13,000	13,000	.00087	.00009	....	....	
14,000	14,000	.00097	.00010	....	....	
15,000	15,000	.00107	.00010	.00012	.00009	
16,000	16,000	.00120	.00013	....	....	
17,000	17,000	.00135	.00015	....	....	
18,000	18,000	.00150	.00015	....	....	
19,000	19,000	.00162	.00012	....	....	
20,000	20,000	.00178	.00016	.00037	.00025	
21,000	21,000	.00194	.00016	....	....	
22,000	22,000	.00216	.00022	....	....	
23,000	23,000	.00239	.00023	....	....	
24,000	24,000	.00268	.00029	....	....	
25,000	25,000	.00299	.00031	.00106	.00069	
30,020	30,020	....	....	....	....	Tensile strength.

Fractured ''.75 from neck. Appearance, granular, gray.

CHASSIS.

No. 5892.

Marks, O H 83.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	....	....	
3,000	3,000	.00011	.00006	....	....	
4,000	4,000	.00017	.00006	....	....	
5,000	5,000	.00023	.00006	....	....	
6,000	6,000	.00030	.00007	....	....	
7,000	7,000	.00037	.00007	....	....	
8.000	8,000	.00044	.00007	....	....	
9.000	9,000	.00051	.00007	....	....	
10.000	10,000	.00059	.00008	.00004	.00004	
11,000	11,000	.00068	.00009	....	....	
12,000	12,000	.00077	.00009	....	....	
13,000	13,000	.00085	.00008	....	....	
14,000	14,000	.00096	.00011	....	....	
15,000	15.000	.00106	.00010	.00014	.00010	
16,000	16,000	.00116	.00010	....	....	
17,000	17,000	.00130	.00014	....	....	
18,000	18,000	.00143	.00013	....	....	
19,000	19.000	.00160	.00017	....	....	
20,000	20,000	.00180	.00020	.00043	.00029	
21,000	21.000	.00200	.00020	....	....	
22,000	22.000	.00230	.00030	....	....	
23,000	23,000	.00258	.00028	....	....	
24,000	24,000	.00298	.00040	....	....	Tensile strength.

Fractured 2″.5 from neck. Appearance, fine granular, gray. Spongy surface of stem in vicinity of fracture. Smooth rounded lump of metal ″.40 × ″.25 in the fractured surface.

CHASSIS.

No. 5896.

Marks, C H 88.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00011	.00005	....	....	
4,000	4,000	.00018	.00007	....	....	
5,000	5,000	.00023	.00005	....	....	
6,000	6,000	.00030	.00007	....	....	
7,000	7,000	.00038	.00008	....	....	
8,000	8,000	.00044	.00006	....	....	
9,000	9,000	.00051	.00007	....	....	
10,000	10,000	.00060	.00009	.00005	.00005	
11,000	11,000	.00069	.00009	....	....	
12,000	12,000	.00078	.00009	....	....	
13,000	13,000	.00088	.00010	....	....	
14,000	14,000	.00098	.00010	....	....	
15,000	15,000	.00109	.00011	.00015	.00010	
16,000	16,000	.00120	.00011	....	....	
17,000	17,000	.00133	.00013	....	....	
18,000	18,000	.00149	.00016	....	....	
19,000	19,000	.00167	.00018	....	....	
20,000	20,000	.00189	.00022	.00050	.00035	
21,000	21,000	.00207	.00018	....	....	
22,000	22,000	.00235	.00028	....	....	
23,000	23,000	.00268	.00033	....	....	
24,000	24,000	.00310	.00042	....	....	
25,000	25,000	.00360	.00050	.00172	.00122	
30,020	30,020	....	....	....	....	Tensile strength.

Fractured ″.55 from neck. Appearance, fine granular, light gray.

CHASSIS RAIL.

No. 5899.

Marks, O R 90.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	....	....	
3,000	3,000	.00012	.00005	....	....	
4,000	4,000	.00018	.00006	....	....	
5,000	5,000	.00023	.00005	....	....	
6,000	6,000	.00030	.00007	....	....	
7,000	7,000	.00038	.00008	....	....	
8,000	8,000	.00045	.00007	....	....	
9,000	9,000	.00051	.00006	....	....	
10,000	10,000	.00060	.00009	.00007	.00007	
11,000	11,000	.00069	.00009	....	....	
12,000	12,000	.00079	.00010	....	....	
13,000	13,000	.00088	.00009	....	....	
14,000	14,000	.00099	.00011	....	....	
15,000	15,000	.00109	.00010	.00018	.00011	
16,000	16,000	.00120	.00011	....	....	
17,000	17,000	.00134	.00014	....	....	
18,000	18,000	.00149	.00015	....	....	
19,000	19,000	.00168	.00019	....	....	
20,000	20,000	.00189	.00021	.00052	.00034	
21,000	21,000	.00210	.00021	....	....	
22,000	22,000	.00233	.00023	....	....	
23,000	23,000	.00270	.00037	....	....	
24,000	24,000	.00307	.00037	....	....	
25,000	25,000	.00358	.00051	.00170	.00118	
30,810	30,810	....	....	....	....	Tensile strength.

Fractured ''.75 from neck. Appearance, granular, gray.

CHASSIS RAIL.

No. 5909.

Marks, C R 92.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	....	....	
3,000	3,000	.00013	.00006	....	....	
4,000	4,000	.00020	.00007	....	....	
5,000	5,000	.00027	.00007	....	....	
6,000	6,000	.00033	.00006	....	....	
7,000	7,000	.00041	.00008	....	....	
8,000	8,000	.00050	.00009	....	....	
9,000	9,000	.00058	.00008	....	....	
10,000	10,000	.00067	.00009	.00006	.00006	
11,000	11,000	.00072	.00005	....	....	
12,000	12,000	.00080	.00008	....	....	
13,000	13,000	.00092	.00012	....	....	
14,000	14,000	.00106	.00014	....	....	
15,000	15,000	.00119	.00013	.00019	.00013	
16,000	16,000	.00133	.00014	....	....	
17,000	17,000	.00149	.00016	....	....	
18,000	18,000	.00163	.00014	....	....	
19,000	19,000	.00185	.00022	....	....	
20,000	20,000	.00208	.00023	.00061	.00042	
21,000	21,000	.00233	.00025	....	....	
22,000	22,000	.00266	.00033	....	....	
23,000	23,000	.00305	.00039	....	....	
24,000	24,000	.00348	.00043	....	....	
25,000	25,000	.00405	.00057	.00205	.00144	
27,410	27,410	....	....	....	....	Tensile strength.

Fractured at the neck. Appearance, fine granular, gray.

CHASSIS RAIL.

No. 5913.

Marks, C R 95.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00012	.00006	....	....	
4,000	4,000	.00019	.00007	....	....	
5,000	5,000	.00024	.00005	....	....	
6,000	6,000	.00031	.00007	....	....	
7,000	7,000	.00039	.00008	....	....	
8,000	8,000	.00047	.00008	....	....	
9,000	9,000	.00054	.00007	....	....	
10,000	10,000	.00062	.00008	.00008	.00008	
11,000	11,000	.00071	.00009	....	....	
12,000	12,000	.00081	.00010	....	....	
13,000	13,000	.00093	.00012	....	....	
14,000	14,000	.00105	.00012	....	....	
15,000	15,000	.00118	.00013	.00022	.00014	
16,000	16,000	.00133	.00015	....	....	
17,000	17,000	.00150	.00017	....	....	
18,000	18,000	.00170	.00020	....	....	
19,000	19,000	.00192	.00022	....	....	
20,000	20,000	.00221	.00029	.00081	.00059	
21,000	21,000	.00260	.00039	....	....	
22,000	22,000	.00305	.00045	....	....	
23,000	23,000	.00360	.00055	....	....	
24,000	24,000	.00415	.00055	....	....	
25,000	25,000	.00520	.00105	.00322	.00241	
27,690	27,690	....	....	....	....	Tensile strength.

Fractured ''.2 from neck. Appearance, fine granular, light gray.

Chassis Rail.

No. 5914.

Marks, C R 96.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	....	....	
3,000	3,000	.00011	.00006	....	....	
4,000	4,000	.00017	.00006	....	....	
5,000	5,000	.00022	.00005	....	....	
6,000	6,000	.00029	.00007	....	....	
7,000	7,000	.00035	.00006	....	....	
8,000	8,000	.00042	.00007	....	....	
9,000	9,000	.00050	.00008	....	....	
10,000	10,000	.00058	.00008	.00003	.00003	
11,000	11,000	.00065	.00007	....	....	
12,000	12,000	.00074	.00009	....	....	
13,000	13,000	.00083	.00009	....	....	
14,000	14,000	.00093	.00010	....	....	
15,000	15,000	.00103	.00010	.00014	.00011	
16,000	16,000	.00114	.00011	....	....	
17,000	17,000	.00127	.00013	....	....	
18,000	18,000	.00141	.00014	....	....	
19,000	19,000	.00158	.00017	....	....	
20,000	20,000	.00177	.00019	.00043	.00029	
21,000	21,000	.00197	.00020	....	....	
22,000	22,000	.00221	.00024	....	....	
23,000	23,000	.00248	.00027	....	....	
24,000	24,000	.00280	.00032	....	....	
25,000	25,000	.00330	.00050	.00147	.00104	
30,810	30,810	....	....	....	....	Tensile strength.

Fractured 2″.7 from neck. Appearance, granular, gray.

CHASSIS.

No. 5917.

Marks, C R 97.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00011	.00005	....	....	
4,000	4,000	.00017	.00006	....	....	
5,000	5,000	.00022	.00005	....	....	
6,000	6,000	.00029	.00007	....	....	
7,000	7,000	.00035	.00006	....	....	
8,000	8,000	.00040	.00005	....	....	
9,000	9,000	.00048	.00008	....	....	
10,000	10,000	.00056	.00008	.00002	.00002	
11,000	11,000	.00063	.00007	....	....	
12,000	12,000	.00069	.00006	....	....	
13,000	13,000	.00078	.00009	....	....	
14,000	14,000	.00087	.00009	....	....	
15,000	15,000	.00096	.00009	.00009	.00007	
16,000	16,000	.00105	.00009	....	....	
17,000	17,000	.00116	.00011	....	....	
18,000	18,000	.00128	.00012	....	....	
19,000	19,000	.00140	.00012	....	....	
20,000	20,000	.00157	.00017	.00031	.00022	
21,000	21,000	.00173	.00016	....	....	
22,000	22,000	.00190	.00017	....	....	
23,000	23,000	.00216	.00026	....	....	
24,000	24,000	.00240	.00024	....	....	
25,000	25,000	.00275	.00035	.00102	.00071	
33,920	33,920	....	....	....	....	Tensile strength.

Fractured ″.95 from neck. Appearance, fine granular, gray.

CHASSIS.

No. 5938.

Marks, C R 100.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	....	....	
3,000	3,000	.00012	.00005	....	....	
4,000	4,000	.00019	.00007	....	....	
5,000	5,000	.00026	.00007	....	....	
6,000	6,000	.00032	.00006	....	....	
7,000	7,000	.00039	.00007	....	....	
8,000	8,000	.00047	.00008	....	....	
9,000	9,000	.00052	.00005	....	....	
10,000	10,000	.00060	.00008	.00004	.00004	
11,000	11,000	.00070	.00010	....	....	
12,000	12,000	.00079	.00009	....	....	
13,000	13,000	.00088	.00009	....	....	
14,000	14,000	.00098	.00010	....	....	
15,000	15,000	.00108	.00010	.00015	.00011	
16,000	16,000	.00120	.00012	....	....	
17,000	17,000	.00130	.00010	....	....	
18,000	18,000	.00142	.00012	....	....	
19,000	19,000	.00159	.00017	....	....	
20,000	20,000	.00177	.00018	.00042	.00027	
21,000	21,000	.00203	.00026	....	....	
22,000	22,000	.00230	.00027	....	....	
23,000	23,000	.00253	.00023	....	....	
24,000	24,000	.00281	.00028	....	....	
25,000	25,000	.00826	.00045	.00139	.00097	
31,020	31,020	....	....	....	....	Tensile strength.

Fractured at the neck. Appearance, uniform granular, gray.

CHASSIS RAIL.

No. 5977.

Marks, C R 102.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00013	.00007	....	....	
4,000	4,000	.00019	.00006	....	....	
5,000	5,000	.00025	.00006	....	....	
6,000	6,000	.00031	.00006	....	....	
7,000	7,000	.00038	.00007	....	....	
8,000	8,000	.00046	.00008	....	....	
9,000	9,000	.00052	.00006	....	....	
10,000	10,000	.00059	.00007	.00004	.00004	
11,000	11,000	.00068	.00009	....	....	
12,000	12,000	.00076	.00008	....	....	
13,000	13,000	.00086	.00010	....	....	
14,000	14,000	.00097	.00011	....	....	
15,000	15,000	.00105	.00008	.00010	.00006	
16,000	16,000	.00113	.00008	....	....	
17,000	17,000	.00124	.00011	....	....	
18,000	18,000	.00137	.00013	....	....	
19,000	19,000	.00148	.00011	....	....	
20,000	20,000	.00159	.00011	.00028	.00018	
21,000	21,000	.00173	.00014	....	....	
22,000	22,000	.00189	.00016	....	....	
23,000	23,000	.00207	.00018	....	....	
24,000	24,000	.00222	.00015	....	....	
25,000	25,000	.00247	.00025	.00070	.00042	
26,000	26,000	.00273	.00026	.00087	.00017	
30,310	30,310	....	....	....	....	Tensile strength.

Fractured ''.2 from neck. Appearance, granular, light gray.

BASE RING.

No. 5747.

Marks, P B R 39.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00012	.00006	....	....	
4,000	4,000	.00018	.00006	....	....	
5,000	5,000	.00024	.00006	....	....	
6,000	6,000	.00031	.00007	....	....	
7,000	7,000	.00038	.00007	....	....	
8,000	8,000	.00044	.00006	....	....	
9,000	9,000	.00051	.00007	....	....	
10,000	10,000	.00059	.00008	.00003	.00003	
11,000	11,000	.00067	.00008	....	....	
12,000	12,000	.00076	.00009	....	....	
13,000	13,000	.00085	.00009	....	....	
14,000	14,000	.00097	.00012	....	....	
15,000	15,000	.00108	.00011	.00018	.00015	
16,000	16,000	.00121	.00013	....	....	
17,000	17,000	.00139	.00018	....	....	
18,000	18,000	.00153	.00014	....	....	
19,000	19,000	.00173	.00020	....	....	
20,000	20,000	.00202	.00029	.00068	.00050	
21,000	21,000	.00232	.00030	....	....	
22,000	22,000	.00270	.00038	....	....	
23,000	23,000	.00325	.00055	....	....	
24,000	24,000	.00370	.00045	....	....	
25,000	25,000	.00460	.00090	.00272	.00204	
27,120	27,120	....	....	....	....	Tensile strength.

Fractured at the neck. Appearance, fine granular, gray.

BASE RING.

No. 5749.

Marks, B R 41.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00004	.00004	....	....	
3,000	3,000	.00010	.00006	....	....	
4,000	4,000	.00016	.00006	....	....	
5,000	5,000	.00022	.00006	....	....	
6,000	6,000	.00029	.00007	....	....	
7,000	7,000	.00035	.00006	....	....	
8,000	8,000	.00042	.00007	....	....	
9,000	9,000	.00049	.00007	....	....	
10,000	10,000	.00056	.00007	.00002	.00002	
11,000	11,000	.00064	.00008	....	....	
12,000	12,000	.00071	.00007	....	....	
13,000	13,000	.00082	.00011	....	....	
14,000	14,000	.00091	.00009	....	....	
15,000	15,000	.00101	.00010	.00011	.00009	
16,000	16,000	.00112	.00011	....	....	
17,000	17,000	.00127	.00015	....	....	
18,000	18,000	.00140	.00013	....	....	
19,000	10,000	.00154	.00014	....	....	
20,000	20,000	.00173	.00019	.00046	.00035	
21,000	21,000	.00193	.00020	....	....	
22,000	22,000	.00220	.00027	....	....	
23,000	23,000	.00252	.00032	....	....	
24,000	24,000	.00291	.00039	....	....	
25,000	25,000	.00333	.00042	.00154	.00108	
29,160	29,160	....	....	....	....	Tensile strength.

Fractured 1″.8 from neck. Appearance, fine granular, gray.

BASE RING.

No. 5751.

Marks, B R 42.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00012	.00006	....	....	
4,000	4,000	.00018	.00006	....	....	
5,000	5,000	.00024	.00006	....	....	
6,000	6,000	.00030	.00006	....	....	
7,000	7,000	.00038	.00008	....	....	
8,000	8,000	.00044	.00006	....	....	
9,000	9,000	.00052	.00008	....	....	
10,000	10,000	.00060	.00008	.00004	.00004	
11,000	11,000	.00068	.00008	....	....	
12,000	12,000	.00077	.00009	....	....	
13,000	13,000	.00087	.00010	....	....	
14,000	14,000	.00096	.00009	....	....	
15,000	15,000	.00107	.00011	.00015	.00011	
16,000	16,000	.00119	.00012	....	....	
17,000	17,000	.00131	.00012	....	....	
18,000	18,000	.00147	.00016	....	....	
19,000	19,000	.00162	.00015	....	....	
20,000	20,000	.00181	.00019	.00050	.00035	
21,000	21,000	.00203	.00022	....	....	
22,000	22,000	.00228	.00025	....	....	
23,000	23,000	.00254	.00026	....	....	
24,000	24,000	.00288	.00034	....	....	
25,000	25,000	.00335	.00047	.00160	.00110	
29,860	29,860	....	....	....	....	Tensile strength.

Fractured 2″.4 from neck. Appearance, fine granular, gray.

BASE RING.

No. 5754.

Marks, B R 43.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00012	.00006	....	....	
4,000	4,000	.00019	.00007	....	....	
5,000	5,000	.00025	.00006	....	....	
6,000	6,000	.00031	.00006	....	....	
7,000	7,000	.00039	.00008	....	....	
8,000	8,000	.00047	.00008	....	....	
9,000	9,000	.00053	.00006	....	....	
10,000	10,000	.00061	.00008	.00003	.00003	
11,000	11,000	.00069	.00008	....	....	
12,000	12,000	.00078	.00009	....	....	
13,000	13,000	.00087	.00009	....	....	
14,000	14,000	.00097	.00010	....	....	
15,000	15,000	.00107	.00010	.00011	.00008	
16,000	16,000	.00118	.00011	....	....	
17,000	17,000	.00131	.00013	....	....	
18,000	18,000	.00145	.00014	....	....	
19,000	19,000	.00159	.00014	....	....	
20,000	20,000	.00178	.00019	.00038	.00027	
21,000	21,000	.00200	.00022	....	....	
22,000	22,000	.00218	.00018	....	....	
23,000	23,000	.00246	.00028	....	....	
24,000	24,000	.00275	.00029	....	....	
25,000	25,000	.00334	.00059	.00138	.00100	
26,100	26,100	....	....	....	....	Tensile strength.

Fractured 1″ from neck. Appearance, fine granular, dark gray.

BASE RING.

No. 5756.

Marks, L B R 44.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	....	....	
3,000	3,000	.00012	.00005	....	....	
4,000	4,000	.00018	.00006	....	....	
5,000	5,000	.00024	.00006	....	....	
6,000	6,000	.00030	.00006	....	....	
7,000	7,000	.00038	.00008	....	....	
8,000	8,000	.00045	.00007	....	....	
9,000	9,000	.00031	.00006	....	....	
10,000	10,000	.00059	.00008	.00005	.00005	
11,000	11,000	.00068	.00009	....	....	
12,000	12,000	.00078	.00010	....	....	
13,000	13,000	.00086	.00008	....	....	
14,000	14,000	.00097	.00011	....	....	
15,000	15,000	.00106	.00011	.00014	.00009	
16,000	16,000	.00117	.00011	....	....	
17,000	17,000	.00130	.00013	....	....	
18,000	18,000	.00145	.00015	....	....	
19,000	19,000	.00160	.00015	....	....	
20,000	20,000	.00179	.00019	.00049	.00035	
21,000	21,000	.00200	.00021	....	....	
22,000	22,000	.00223	.00023	....	....	
23,000	23,000	.00252	.00029	....	....	
24,000	24,000	.00292	.00040	....	....	
25,000	25,000	.00343	.00051	.00160	.00111	
28,500	28,500	....	....	....	....	Tensile strength.

Fractured 1″.40 from neck. Appearance, fine granular, dark gray.

BASE RING.

No. 5762.

Marks, B R 47.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005			
3,000	3,000	.00010	.00005			
4,000	4,000	.00015	.00005			
5,000	5,000	.00021	.00006			
6,000	6,000	.00027	.00006			
7,000	7,000	.00034	.00007			
8,000	8,000	.00041	.00007			
9,000	9,000	.00047	.00006			
10,000	10,000	.00055	.00008	.00005	.00005	
11,000	11,000	.00064	.00009			
12,000	12,000	.00075	.00011			
13,000	13,000	.00085	.00010			
14,000	14,000	.00096	.00011			
15,000	15,000	.00107	.00011	.00017	.00012	
16,000	16,000	.00118	.00011			
17,000	17,000	.00133	.00015			
18,000	18,000	.00148	.00015			
19,000	19,000	.00167	.00019			
20,000	20,000	.00188	.00021	.00050	.00033	
21,000	21,000	.00211	.00023			
22,000	22,000	.00232	.00021			
23,000	23,000	.00268	.00036			
24,000	24,000	.00308	.00040			
25,000	25,000	.00368	.00060	.00172	.00122	
28,130	28,130					Tensile strength.

Fractured at the neck. Appearance, fine granular, gray.

BASE RING.

No. 5766.

Marks, B R 49.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1, 000	1, 000	0.	0.	0.	0.	Initial load.
2, 000	2, 000	.00007	.00007	....	....	
3, 000	3, 000	.00012	.00005	....	....	
4, 000	4, 000	.00019	.00007	....	....	
5, 000	5, 000	.00026	.00007	....	....	
6, 000	6, 000	.00033	.00007	....	....	
7, 000	7, 000	.00039	.00006	....	....	
8, 000	8, 000	.00048	.00009	....	....	
9, 000	9, 000	.00056	.00008	....	....	
10, 000	10, 000	.00065	.00009	.00003	.00003	
11, 000	11, 000	.00072	.00007	....	....	
12, 000	12, 000	.00082	.00010	....	....	
13, 000	13, 000	.00093	.00011	....	....	
14, 000	14, 000	.00106	.00013	....	....	
15, 000	15, 000	.00119	.00013	.00018	.00015	
16, 000	16, 000	.00136	.00017	....	....	
17, 000	17, 000	.00156	.00020	....	....	
18, 000	18, 000	.00176	.00020	....	....	
19, 000	19, 000	.00204	.00028	....	....	
20, 000	20, 000	.00235	.00031	.00085	.00067	
21, 000	21, 000	.00275	.00040	....	....	
22, 000	22, 000	.00323	.00048	....	....	
23, 000	23, 000	.00375	.00052	....	....	
24, 000	24, 000	.00464	.00089	....	....	
25, 000	25, 000	.00570	.00106	.00361	.00276	
26, 980	26, 980	....	....	....	....	Tensile strength.

Fractured 1″.3 from neck. Appearance, fine granular, gray.

BASE RING.

No. 5769.

Marks, B R 51.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loands.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00012	.00006	....	....	
4,000	4,000	.00018	.00006	....	....	
5,000	5,000	.00023	.00005	....	....	
6,000	6,000	.00030	.00007	....	....	
7,000	7,000	.00038	.00008	....	....	
8,000	8,000	.00046	.00008	....	....	
9,000	9,000	.00053	.00007	....	....	
10,000	10,000	.00061	.00008	.00006	.00006	
11,000	11,000	.00070	.00009	....	....	
12,000	12,000	.00080	.00010	....	....	
13,000	13,000	.00091	.00011	....	....	
14,000	14,000	.00103	.00012	....	....	
15,000	15,000	.00118	.00015	.00022	.00016	
16,000	16,000	.00133	.00015	....	....	
17,000	17,000	.00151	.00018	....	....	
18,000	18,000	.00171	.00020	....	....	
19,000	19,000	.00197	.00026	....	....	
20,000	20,000	.00228	.00031	.00086	.00064	
21,000	21,000	.00258	.00030	....	....	
22,000	22,000	.00305	.00047	....	....	
23,000	23,000	.00359	.00054	....	....	
24,000	24,000	.00429	.00070	....	....	
25,000	25,000	.00519	.00090	.00319	.00233	
26,990	26,990	....	....	....	....	Tensile strength.

Fractured at the neck. Appearance, granular, gray.

BASE RING.

No. 5780.

Marks, L B R 53.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1, 000	1, 000	0.	0.	0.	0.	Initial load.
2, 000	2, 000	.00008	.00008	....	....	
3, 000	3, 000	.00014	.00006	....	....	
4, 000	4, 000	.00020	.00006	....	....	
5, 000	5, 000	.00028	.00008	....	....	
6, 000	6, 000	.00035	.00007	....	....	
7, 000	7, 000	.00042	.00007	....	....	
8, 000	8, 000	.00050	.00008	....	....	
9, 000	9, 000	.00058	.00008	....	....	
10, 000	10, 000	.00067	.00009	.00005	.00005	
11, 000	11, 000	.00070	.00009	....	....	
12, 000	12, 000	.00086	.00010	....	....	
13, 000	13, 000	.00096	.00010	....	....	
14, 000	14, 000	.00107	.00011	....	....	
15, 000	15, 000	.00119	.00012	.00019	.00014	
16, 000	16, 000	.00131	.00012	....	....	
17, 000	17, 000	.00147	.00016	....	....	
18, 000	18, 000	.00164	.00017	....	....	
19, 000	19, 000	.00184	.00020	....	....	
20, 000	20, 000	.00210	.00026	.00062	.00043	
21, 000	21, 000	.00234	.00024	....	....	
22, 000	22, 000	.00270	.00036	....	....	
23, 000	23, 000	.00305	.00035	....	....	
24, 000	24, 000	.00358	.00053	....	....	
25, 000	25, 000	.00410	.00052	.00209	.00147	
30, 120	30, 120	....	....	....	....	Tensile strength.

Fractured at the neck. Appearance, fine granular, gray.

BASE RING.

No. 5788.

Marks, B R 54.
Diameter, 1″.129.
Sectional area, 1 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation. per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	....	....	
3,000	3,000	.00013	.00006	....	....	
4,000	4,000	.00020	.00007	....	....	
5,000	5,000	.00028	.00008	....	....	
6,000	6,000	.00035	.00007	....	....	
7,000	7,000	.00041	.00006	....	....	
8,000	8,000	.00049	.00008	....	....	
9,000	9,000	.00059	.00010	....	....	
10,000	10,000	.00067	.00008	.00006	.00006	
11,000	11,000	.00075	.00008	....	....	
12,000	12,000	.00085	.00010	....	....	
13,000	13,000	.00096	.00011	....	....	
14,000	14,000	.00108	.00012	....	....	
15,000	15,000	.00119	.00011	.00017	.00011	
16,000	16,000	.00131	.00012	....	....	
17,000	17,000	.00147	.00016	....	....	
18,000	18,000	.00163	.00016	....	....	
19,000	19,000	.00181	.00018	....	....	
20,000	20,000	.00203	.00022	.00053	.00036	
21,000	21,000	.00226	.00023	....	....	
22,000	22,000	.00254	.00028	....	....	
23,000	23,000	.00286	.00032	....	....	
24,000	24,000	.00331	.00045	....	....	
25,000	25,000	.00379	.00048	.00178	.00125	
29,180	29,180	....	....	....	....	Tensile strength.

Fractured at the neck. Appearance, fine granular, dark gray.

BASE RING.

No. 5793.

Marks, B R 55.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006			
3,000	3,000	.00013	.00007			
4,000	4,000	.00020	.00007			
5,000	5,000	.00029	.00009			
6,000	6,000	.00036	.00007			
7,000	7,000	.00043	.00007			
8,000	8,000	.00052	.00009			
9,000	9,000	.00062	.00010			
10,000	10,000	.00071	.00011	.00008	.00008	
11,000	11,000	.00081	.00010			
12,000	12,000	.00091	.00010			
13,000	13,000	.00103	.00012			
14,000	14,000	.00117	.00014			
15,000	15,000	.00130	.00013	.00022	.00014	
16,000	16,000	.00148	.00018			
17,000	17,000	.00163	.00015			
18,000	18,000	.00183	.00020			
19,000	19,000	.00209	.00026			
20,000	20,000	.00238	.00029	.00080	.00058	
21,000	21,000	.00267	.00029			
22,000	22,000	.00310	.00043			
23,000	23,000	.00355	.00045			
24,000	24,000	.00405	.00050			
25,000	25,000	.00491	.00086	.00268	.00188	
26,620	26,620					Tensile strength.

Fractured 2″.5 from neck. Appearance, granular, gray.

BASE RING.

No. 5815.

Marks, B R 60.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00012	.00006	....	....	
4,000	4,000	.00020	.00008	....	....	
5,000	5,000	.00026	.00006	....	....	
6,000	6,000	.00032	.00006	....	....	
7.000	7,000	.00039	.00007	....	....	
8,000	8,000	.00045	.00006	....	....	
9,000	9,000	.00053	.00008	....	....	
10,000	10,000	.00061	.00008	.00004	.00004	
11,000	11,000	.00070	.00009	....	....	
12,000	12,000	.00079	.00009	....	....	
13,000	13,000	.00089	.00010	....	....	
14,000	14,000	.00099	.00010	....	....	
15,000	15,000	.00110	.00011	.00012	.00008	
16,000	16,000	.00121	.00011	....	....	
17,000	17,000	.00132	.00011	....	....	
18,000	18,000	.00148	.00016	....	....	
19,000	19,000	.00162	.00014	....	....	
20,000	20,000	.00181	.00019	.00042	.00030	
21,000	21,000	.00200	.00019	....	....	
22,000	22,000	.00224	.00024	....	....	
23,000	23,000	.00251	.00027	....	....	
24,000	24,000	.00277	.00026	....	....	
25,000	25,000	.00328	.00046	.00130	.00088	
31,890	31,890	....	....	....	....	Tensile strength.

Fractured ″.75 from neck. Appearance, granular, gray.

BASE RING.

No. 5842.

Marks, B R 64.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00012	.00006	....	....	
4,000	4,000	.00018	.00006	....	....	
5,000	5,000	.00024	.00006	....	....	
6,000	6,000	.00030	.00006	....	....	
7,000	7,000	.00036	.00006	....	....	
8,000	8,000	.00043	.00007	....	....	
9,000	9,000	.00048	.00005	....	....	
10,000	10,000	.00056	.00008	.00003	.00003	
11,000	11,000	.00064	.00008	....	....	
12,000	12,000	.00074	.00010	....	....	
13,000	13,000	.00082	.00008	....	....	
14,000	14,000	.00090	.00008	....	....	
15,000	15,000	.00099	.00009	.00012	.00009	
16,000	16,000	.00110	.00011	....	....	
17,000	17,000	.00123	.00013	....	....	
18,000	18,000	.00136	.00013	....	....	
19,000	19,000	.00151	.00015	....	....	
20,000	20,000	.00167	.00016	.00040	.00028	
21,000	21,000	.00186	.00019	....	....	
22,000	22,000	.00213	.00027	....	....	
23,000	23,000	.00236	.00023	....	....	
24,000	24,000	.00266	.00030	....	....	
25,000	25,000	.00306	.00040	.00132	.00092	
31,860	31,860	....	....	....	....	Tensile strength.

Fractured ''.4 from neck. Appearance, fine granular, light gray.

BASE RING.

No. 5847.

Marks, B R 68.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	....	....	
3,000	3,000	.00010	.00005	....	....	
4,000	4,000	.00018	.00008	....	....	
5,000	5,000	.00025	.00007	....	....	
6,000	6,000	.00030	.00005	....	....	
7,000	7,000	.00037	.00007	....	....	
8,000	8,000	.00045	.00008	....	....	
9,000	9,000	.00053	.00008	....	....	
10,000	10,000	.00061	.00008	.00005	.00005	
11,000	11,000	.00068	.00007	....	....	
12,000	12,000	.00077	.00009	....	....	
13,000	13,000	.00088	.00011	....	....	
14,000	14,000	.00099	.00011	....	....	
15,000	15,000	.00110	.00011	.00017	.00012	
16,000	16,000	.00124	.00014	....	....	
17,000	17,000	.00138	.00014	....	....	
18,000	18,000	.00153	.00015	....	....	
19,000	19,000	.00173	.00020	....	....	
20,000	20,000	.00193	.00020	.00056	.00039	
21,000	21,000	.00217	.00024	....	....	
22,000	22,000	.00246	.00029	....	....	
23,000	23,000	.00280	.00034	....	....	
24,000	24,000	.00323	.00043	....	....	
25,000	25,000	.00372	.00049	.00180	.00124	
29,500	29,500	....	....	....	....	Tensile strength.

Fractured 6'' from neck. Appearance, fine granular, gray.

BASE RING.

No. 5855.

Marks, B R 71.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1, 000	1, 000	0.	0.	0.	0.	Initial load.
2, 000	2, 000	.00005	.00005	....	....	
3, 000	3, 000	.00010	.00005	....	....	
4, 000	4, 000	.00016	.00006	....	....	
5, 000	5, 000	.00021	.00005	....	....	
6, 000	6, 000	.00029	.00008	....	....	
7, 000	7, 000	.00035	.00006	....	....	
8, 000	8, 000	.00041	.00006	....	....	
9, 000	9, 000	.00050	.00009	....	....	
10, 000	10, 000	.00059	.00009	.00003	.00003	
11, 000	11, 000	.00067	.00008	....	....	
12, 000	12, 000	.00078	.00011	....	....	
13, 000	13, 000	.00090	.00012	....	....	
14, 000	14, 000	.00100	.00010	....	....	
15, 000	15, 000	.00113	.00013	.00020	.00017	
16, 000	16, 000	.00129	.00016	....	....	
17, 000	17, 000	.00148	.00019	....	....	
18, 000	18, 000	.00165	.00017	....	....	
19, 000	19, 000	.00189	.00024	....	....	
20, 000	20, 000	.00219	.00030	.00078	.00058	
21, 000	21, 000	.00250	.00031	....	....	
22, 000	22. 000	.00288	.00038	....	....	
23, 000	23, 000	.00332	.00044	....	....	
24, 000	24, 000	.00390	.00058	....	....	
25, 000	25, 000	.00469	.00079	.00271	.00193	
27, 800	27, 800	....	....	....	....	Tensile strength.

Fractured ''.7 from neck. Appearance, fine granular, gray.

BASE RING.

No. 5861.

Marks, B R 73.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006			
3,000	3,000	.00011	.00005			
4,000	4,000	.00017	.00006			
5,000	5,000	.00023	.00006			
6,000	6,000	.00030	.00007			
7,000	7,000	.00036	.00006			
8,000	8,000	.00042	.00006			
9,000	9,000	.00050	.00008			
10,000	10,000	.00057	.00007	.00005	.00005	
11,000	11,000	.00064	.00007			
12,000	12,000	.00072	.00008			
13,000	13,000	.00081	.00009			
14,000	14,000	.00090	.00009			
15,000	15,000	.00100	.00010	.00011	.00006	
16,000	16,000	.00109	.00009			
17,000	17,000	.00120	.00011			
18,000	18,000	.00131	.00011			
19,000	19,000	.00143	.00012			
20,000	20,000	.00159	.00016	.00033	.00022	
21,000	21,000	.00176	.00017			
22,000	22,000	.00197	.00021			
23,000	23,000	.00217	.00020			
24,000	24,000	.00240	.00023			
25,000	25,000	.00270	.00030			
27,000	27,000	.00355	.00085	.00158	.00125	
28,850	28,850					Tensile strength.

Fractured ″.35 from neck. Appearance, granular, light gray. Small spot of metal with smooth surface at circumference of bar.

BASE RING.

No. 5863.

Marks, B R 74.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	....	....	
3,000	3,000	.00011	.00006	....	....	
4,000	4,000	.00017	.00006	....	....	
5,000	5,000	.00022	.00005	....	....	
6,000	6,000	.00028	.00006	....	....	
7,000	7,000	.00036	.00008	....	....	
8,000	8,000	.00043	.00007	....	....	
9,000	9,000	.00049	.00006	....	....	
10,000	10,000	.00054	.00005	.00003	.00003	
11,000	11,000	.00061	.00007	....	....	
12,000	12,000	.00069	.00008	....	....	
13,000	13,000	.00076	.00007	....	....	
14,000	14,000	.00083	.00007	....	....	
15,000	15,000	.00092	.00009	.00008	.00005	
16,000	16,000	.00099	.00007	....	....	
17,000	17,000	.00108	.00009	....	....	
18,000	18,000	.00116	.00008	....	....	
19,000	19,000	.00126	.00010	....	....	
20,000	20,000	.00136	.00010	.00015	.00007	
21,000	21,000	.00147	.00011	....	....	
22,000	22,000	.00156	.00009	....	....	
23,000	23,000	.00168	.00012	....	....	
24,000	24,000	.00182	.00014	....	....	
25,000	25,000	.00198	.00016	....	....	
26,000	26,000	.00212	.00014	....	....	
27,000	27,000	.00230	.00018	....	....	
28,000	28,000	.00260	.00030	.00071	.00056	
33,420	33,420	....	....	....	....	Tensile strength.

Fractured 2″.4 from neck. Appearance, fine granular, light gray.

BASE RING.

No. 5888.

Marks, B R 81.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00012	.00006	....	....	
4,000	4,000	.00019	.00007	....	....	
5,000	5,000	.00025	.00006	....	....	
6,000	6,000	.00031	.00006	....	....	
7,000	7,000	.00040	.00009	....	....	
8,000	8,000	.00049	.00009	....	....	
9,000	9,000	.00055	.00006	....	....	
10,000	10,000	.00063	.00008	.00007	.00007	
11,000	11,000	.00071	.00008	....	....	
12,000	12,000	.00081	.00010	....	....	
13,000	13,000	.00091	.00010	....	....	
14,000	14,000	.00102	.00011	....	....	
15,000	15,000	.00114	.00012	.00019	.00012	
16,000	16,000	.00128	.00014	....	....	
17,000	17,000	.00141	.00013	....	....	
18,000	18,000	.00158	.00017	....	....	
19,000	19,000	.00176	.00018	....	....	
20,000	20,000	.00199	.00023	.00060	.00041	
21,000	21,000	.00222	.00023	....	....	
22,000	22,000	.00255	.00033	....	....	
23,000	23,000	.00286	.00031	....	....	
24,000	24,000	.00331	.00045	....	....	
25,000	25,000	.00376	.00045	.00187	.00127	
30,710	30,710	....	....	....	....	Tensile strength.

Fractured at the neck. Appearance, fine granular, light gray.

BASE RING.

No. 5893.

Marks, B R 84.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00012	.00006	....	....	
4,000	4,000	.00019	.00007	....	....	
5,000	5,000	.00025	.00006	....	....	
6,000	6,000	.00031	.00006	....	....	
8,000	7,000	.00038	.00007	....	....	
8,000	8,000	.00046	.00008	....	....	
9,000	9,000	.00052	.00006	....	....	
10,000	10,000	.00060	.00008	.00006	.00006	
11,000	11,000	.00068	.00008	....	....	
12,000	12,000	.00078	.00010	....	....	
13,000	13,000	.00086	.00008	....	....	
14,000	14,000	.00006	.00010	....	....	
15,000	15,000	.00106	.00010	.00014	.00008	
16,000	16,000	.00116	.00010	....	....	
17,000	17,000	.00130	.00014	....	....	
18,000	18,000	.00142	.00012	....	....	
19,000	19,000	.00156	.00014	....	....	
20,000	20,000	.00171	.00015	.00041	.00027	
21,000	21,000	.00190	.00019	....	....	
22,000	22,000	.00210	.00020	....	....	
23,000	23,000	.00240	.00030	....	....	
24,000	24,000	.00270	.00030	....	....	
25,000	25,000	.00300	.00030	.00123	.00082	
31,940	31,940	....	....	....	....	Tensile strength.

Fractured 1″.8 from neck. Appearance, granular, gray.

BASE RING.

No. 5894.

Marks, B R 86.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2.000	2,000	.00007	.00007	....	....	
3,000	3,000	.00015	.00008	....	....	
4,000	4,000	.00021	.00006	....	....	
5,000	5,000	.00029	.00008	....	....	
6,000	6,000	.00036	.00007	....	....	
7,000	7,000	.00041	.00005	....	....	
8,000	8,000	.00049	.00008	....	....	
9,000	9,000	.00056	.00007	....	....	
10,000	10,000	.00062	.00006	0.	....	
11.000	11,000	.00069	.00007	....	....	
12,000	12,000	.00078	.00009	....	....	
13,000	13,000	.00088	.00010	....	....	
14,000	14,000	.00097	.00009	....	....	
15,000	15,000	.00107	.00010	.00008	.00008	
16,000	16,000	.00118	.00011	....	....	
17,000	17,000	.00132	.00014	....	....	
18,000	18,000	.00147	.00015	....	....	
19,000	19,000	.00165	.00018	....	....	
20,000	20,000	.00180	.00015	.00036	.00028	
21,000	21,000	.00201	.00021	....	....	
22,000	22,000	.00226	.00025	....	....	
23,000	23,000	.00254	.00028	....	....	
24,000	24,000	.00289	.00035	....	....	
25,000	25,000	.00329	.00040	.00133	.00097	
30,810	30,810	....	....	....	....	Tensile strength.

Fractured 1''.25 from neck. Appearance, fine granular, light gray.

BASE RING.

No. 5895.

Marks, B R 87.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00005	.00005	....	....	
3,000	3,000	.00009	.00004	....	....	
4,000	4,000	.00016	.00007	....	....	
5,000	5,000	.00021	.00005	....	....	
6,000	6,000	.00028	.00007	....	....	
7,000	7,000	.00033	.00005	....	....	
8,000	8,000	.00040	.00007	....	....	
9,000	9,000	.00047	.00007	....	....	
10,000	10,000	.00054	.00007	.00002	.00002	
11,000	11,000	.00061	.00007	....	....	
12,000	12,000	.00070	.00009	....	....	
13,000	13,000	.00078	.00008	....	....	
14,000	14,000	.00086	.00008	....	....	
15,000	15,000	.00095	.00009	.00010	.00008	
16,000	16,000	.00104	.00009	....	....	
17,000	17,000	.00115	.00011	....	....	
18,000	18,000	.00126	.00011	....	....	
19,000	19,000	.00139	.00013	....	....	
20,000	20,000	.00151	.00012	.00029	.00019	
21,000	21,000	.00167	.00016	....	....	
22,000	22,000	.00182	.00015	....	....	
23,000	23,000	.00205	.00023	....	....	
24,000	24,000	.00227	.00022	....	....	
25,000	25,000	.00252	.00025	.00085	.00056	
29,930	29,930	....	....	....	....	Tensile strength.

Fractured 3''.3 from neck. Appearance, fine granular, gray. Spongy spot ''.12 diameter at the circumference.

BASE RING.

No. 5900.

Marks, B R 91.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00012	.00006	....	....	
4,000	4,000	.00019	.00007	....	....	
5,000	5,000	.00026	.00007	....	....	
6,000	6,000	.00032	.00006	....	....	
7,000	7,000	.00039	.00007	....	....	
8,000	8,000	.00047	.00008	....	....	
9,000	9,000	.00052	.00005	....	....	
10,000	10,000	.00061	.00009	.00002	.00002	
11,000	11,000	.00070	.00009	....	....	
12,000	12,000	.00080	.00010	....	....	
13,000	13,000	.00090	.00010	....	....	
14,000	14,000	.00100	.00010	....	....	
15,000	15,000	.00110	.00010	.00014	.00012	
16,000	16,000	.00122	.00012	....	....	
17,000	17,000	.00137	.00015	....	....	
18,000	18,000	.00151	.00014	....	....	
19,000	19,000	.00168	.00017	....	....	
20,000	20,000	.00188	.00020	.00048	.00034	
21,000	21,000	.00210	.00022	....	....	
22,000	22,000	.00232	.00022	....	....	
23,000	23,000	.00266	.00034	....	....	
24,000	24,000	.00300	.00034	....	....	
25,000	25,000	.00348	.00048	.00159	.00111	
26,020	26,020	....	....	....	....	Tensile strength.

Fractured ″.9 from neck. Appearance, granular, gray. Spongy spot and lump of smooth lustrous metal ″.25 × ″.15 at the circumference of the fractured surface.

BASE RING.

No. 5912.

Marks, B R 49.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00012	.00006	....	....	
4,000	4,000	.00019	.00007	....	....	
5,000	5,000	.00026	.00007	....	....	
6,000	6,000	.00032	.00006	....	....	
7,000	7,000	.00041	.00009	....	....	
8,000	8,000	.00050	.00009	....	....	
9,000	9,000	.00059	.00009	....	....	
10,000	10,000	.00069	.00010	.00009	.00009	
11,000	11,000	.00078	.00009	....	....	
12,000	12,000	.00089	.00011	....	....	
13,000	13,000	.00100	.00011	....	....	
14,000	14,000	.00113	.00013	....	....	
15,000	15,000	.00129	.00016	.00029	.00020	
16,000	16,000	.00146	.00017	....	....	
17,000	17,000	.00167	.00021	....	....	
18,000	18,000	.00189	.00022	....	....	
19,000	19,000	.00219	.00030	....	....	
20,000	20,000	.00255	.00036	.00104	.00075	
20,900	20,900	....	....	....	....	Tensile strength.

Fractured 4″.75 from neck. Appearance, fine granular, gray. A streak of smooth lustrous metal ″.15 by ″.45 extended along the fractured surface.

BASE RING.

No. 5918.

Marks, B R 98.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0	0.	0.	Initial load.
2,000	2,000	.00006	.00006			
3,000	3,000	.00011	.00005			
4,000	4,000	.00017	.00006			
5,000	5,000	.00022	.00005			
6,000	6,000	.00029	.00007			
7,000	7,000	.00034	.00005			
8,000	8,000	.00041	.00007			
9,000	9,000	.00049	.00008			
10,000	10,000	.00056	.00007	.00001	.00001	
11,000	11,000	.00064	.00008			
12,000	12,000	.00070	.00006			
13,000	13,000	.00080	.00010			
14,000	14,000	.00089	.00009			
15,000	15,000	.00099	.00010	.00010	.00009	
16,000	16,000	.00109	.00010			
17,000	17,000	.00121	.00012			
18,000	18,000	.00136	.00015			
19,000	19,000	.00149	.00013			
20,000	20,000	.00168	.00019	.00039	.00029	
21,000	21,000	.00188	.00020			
22,000	22,000	.00210	.00022			
23,000	23,000	.00238	.00028			
24,000	24,000	.00270	.00032			
25,000	25,000	.00303	.00033	.00128	.00089	
30,800	30,800					Tensile strength.

Fractured at the neck. Appearance, fine granular, gray.

Base Ring.

No. 5939.

Marks, B R 99.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00012	.00006	....	....	
4,000	4,000	.00018	.00006	....	....	
5,000	5,000	.00025	.00007	....	....	
6,000	6,000	.00031	.00006	....	....	
7,000	7,000	.00038	.00007	....	....	
8,000	8,000	.00045	.00007	....	....	
9,000	9,000	.00051	.00006	....	....	
10,000	10,000	.00059	.00008	.00003	.00003	
11,000	11,000	.00067	.00008	....	....	
12,000	12,000	.00076	.00009	....	....	
13,000	13,000	.00084	.00008	....	....	
14,000	14,000	.00092	.00008	....	....	
15,000	15,000	.00103	.00011	.00012	.00009	
16,000	16,000	.00114	.00011	....	....	
17,000	17,000	.00127	.00013	....	....	
18,000	18,000	.00138	.00011	....	....	
19,000	19,000	.00154	.00016	....	....	
20,000	20,000	.00169	.00015	.00040	.00028	
21,000	21,000	.00188	.00019	....	....	
22,000	22,000	.00209	.00021	....	....	
23,000	23,000	.00230	.00021	....	....	
24,000	24,000	.00259	.00029	....	....	
25,000	25,000	.00298	.00039	.00120	.00080	
29,240	29,240	....	....	....	....	Tensile strength.

Fractured 1″.25 from neck. Appearance, granular, gray. Slightly spongy at a spot in the circumference.

BASE RING.

No. 5951.

Marks, B R 101.
Diameter, 1''.129.
Section area, 1.00 square inches.
Length of stem, 10.''
Gauged length, 10.''

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00011	.00005	....	....	
4,000	4,000	.00017	.00006	....	....	
5,000	5,000	.00022	.00005	....	....	
6,000	6,000	.00029	.00007	....	....	
7,000	7,000	.00034	.00005	....	....	
8,000	8,000	.00041	.00007	....	....	
9,000	9,000	.00048	.00007	....	....	
10,000	10,000	.00055	.00007	0.	....	
11,000	11,000	.00064	.00009	....	....	
12,000	12,000	.00072	.00008	....	....	
13,000	13,000	.00081	.00009	....	....	
14,000	14,000	.00090	.00009	....	....	
15,000	15,000	.00100	.00010	.00011	.00011	
16,000	16,000	.00111	.00011	....	....	
17,000	17,000	.00123	.00012	....	....	
18,000	18,000	.00139	.00016	....	....	
19,000	19,000	.00151	.00012	....	....	
20,000	20,000	.00170	.00019	.00041	.00030	
21,000	21,000	.00192	.00022	....	....	
22,000	22,000	.00219	.00027	....	....	
23,000	23,000	.00242	.00023	....	....	
24,000	24,000	.00280	.00038	....	....	
25,000	25,000	.00328	.00048	.00150	.00109	
31,010	31,010	....	....	....	....	Tensile strength.

Fractured at the neck. Appearance, granular, gray.

RACER.

No. 5759.

Marks, R 46.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	....	....	
3,000	3,000	.00013	.00006	....	....	
4,000	4,000	.00018	.00005	....	....	
5,000	5,000	.00024	.00006	....	....	
6,000	6,000	.00029	.00005	....	....	
7,000	7,000	.00036	.00007	....	....	
8,000	8,000	.00043	.00007	....	....	
9,000	9,000	.00050	.00007	....	....	
10,000	10,000	.00058	.00008	.00003	.00003	
11,000	11,000	.00064	.00006	....	....	
12,000	12,000	.00071	.00007	....	....	
13,000	13,000	.00080	.00009	....	....	
14,000	14,000	.00089	.00009	....	....	
15,000	15,000	.00099	.00010	.00010	.00007	
16,000	16,000	.00108	.00009	....	....	
17,000	17,000	.00118	.00010	....	....	
18,000	18,000	.00128	.00010	....	....	
19,000	19,000	.00141	.00013	....	....	
20,000	20,000	.00153	.00012	.00028	.00018	
21,000	21,000	.00170	.00017	....	....	
22,000	22,000	.00186	.00016	....	....	
23,000	23,000	.00202	.00016	....	....	
24,000	24,000	.00230	.00028	....	....	
25,000	25,000	.00250	.00020	.00079	.00051	
29,130	29,130	....	....	....	....	Tensile strength.

Fractured 4''.6 from neck. Appearance, fine granular, light gray.

RACER.

No. 5764.

Marks, R 48.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00012	.00006	....	....	
4,000	4,000	.00019	.00007	....	....	
5,000	5,000	.00026	.00007	....	....	
6,000	6,000	.00033	.00007	....	....	
7,000	7,000	.00041	.00008	....	....	
8,000	8,000	.00049	.00008	....	....	
9,000	9,000	.00057	.00008	....	....	
10,000	10,000	.00065	.00008	.00005	.00005	
11,000	11,000	.00073	.00008	....	....	
12,000	12,000	.00082	.00009	....	....	
13,000	13,000	.00093	.00011	....	....	
14,000	14,000	.00103	.00010	....	....	
15,000	15,000	.00116	.00013	.00018	.00013	
16,000	16,000	.00128	.00012	....	....	
17,000	17,000	.00140	.00012	....	....	
18,000	18,000	.00156	.00016	....	....	
19,000	19,000	.00172	.00016	....	....	
20,000	20,000	.00194	.00022	.00052	.00034	
21,000	21,000	.00217	.00023	....	....	
22,000	22,000	.90244	.00027	....	....	
23,000	23,000	.00279	.00035	....	....	
24,000	24,000	.00320	.00041	....	....	
25,000	25,000	.00370	.00050	.00175	.00123	
29,640	29,640	....	....	....	....	Tensile strength.

Fractured 1″.2 from neck. Appearance, fine granular, gray.

Racer.

No. 5767.

Marks, R 50.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00013	.00007	....	....	
4,000	4,000	.00018	.00005	....	....	
5,000	5,000	.00024	.00006	....	....	
6,000	6,000	.00030	.00006	....	....	
7,000	7,000	.00038	.00008	....	....	
8,000	8,000	.00045	.00007	....	....	
9,000	9,000	.00051	.00006	....	....	
10,000	10,000	.00058	.00007	.00005	.00005	
11,000	11,000	.00065	.00007	....	....	
12,000	12,000	.00072	.00007	....	....	
13,000	13,000	.00081	.00009	....	....	
14,000	14,000	.00090	.00009	....	....	
15,000	15,000	.00099	.00009	.00010	.00005	
16,000	16,000	.00108	.00009	....	....	
17,000	17,000	.00118	.00010	....	....	
18,000	18,000	.00128	.00010	....	....	
19,000	19,000	.00140	.00012	....	....	
20,000	20,000	.00152	.00012	.00023	.00013	
21,000	21,000	.00165	.00013	....	....	
22,000	22,000	.00178	.00013	....	....	
23,000	23,000	.00194	.00016	....	....	
24,000	24,000	.00214	.00020	....	....	
25,000	25,000	.00236	.00022	.00062	.00039	
26,000	26,000	.00258	.00022	.00077	.00015	
34,710	34,710	....	....	....	....	Tensile strength.

Fractured ''.35 from neck. Appearance, fine granular, mottled.

RACER.

No. 5779.

Marks, R 52.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00012	.00006	....	....	
4,000	4,000	.00018	.00006	....	....	
5,000	5,000	.00024	.00006	....	....	
6,000	6,000	.00031	.00007	....	....	
7,000	7,000	.00037	.00006	....	....	
8,000	8,000	.00044	.00007	....	....	
9,000	9,000	.00050	.00006	....	....	
10,000	10,000	.00057	.00007	.00003	.00003	
11,000	11,000	.00064	.00007	....	....	
12,000	12,000	.00071	.00007	....	....	
13,000	13,000	.00079	.00008	....	....	
14,000	14,000	.00087	.00008	....	....	
15,000	15,000	.00095	.00008	.00007	.00004	
16,000	16,000	.00102	.00007	....	....	
17,000	17,000	.00110	.00008	....	....	
18,000	18.000	.00119	.00009	....	....	
19,000	19,000	.00129	.00010	....	....	
20,000	20,000	.00139	.00010	.00016	.00009	
21,000	21,000	.00150	.00011	....	....	
22,000	22,000	.00161	.00011	....	....	
23,000	23,000	.00172	.00011	....	....	
24,000	24,000	.00185	.00013	....	....	
25,000	25,000	.00200	.00015	.00036	.00020	
26,000	26,000	.00215	.00015	....	....	
27,000	27,000	.00230	.00015	....	....	
28,000	28,000	.00250	.00020	....	....	
29,000	29,000	.00271	.00021	....	....	
30,000	30,000	.00293	.00022	.00083	.00047	
36,320	36,320	....	....	....	....	Tensile strength.

Fractured ″.55 from neck. Appearance, fine granular, gray.

RACER.

No. 5808.

Marks, R 57.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00013	.00007	....	....	
4,000	4,000	.00020	.00007	....	....	
5,000	5,000	.00027	.00007	....	....	
6,000	6,000	.00034	.00007	....	....	
7,000	7,000	.00041	.00007	....	....	
8,000	8,000	.00049	.00008	....	....	
9,000	9,000	.00059	.00010	....	....	
10,000	10,000	.00069	.00010	.00008	.00008	
11,000	11,000	.00079	.00010	....	....	
12,000	12,000	.00088	.00009	....	....	
13,000	13,000	.00096	.00008	....	....	
14,000	14,000	.00106	.00010	....	....	
15,000	15,000	.00117	.00011	.00019	.00011	
16,000	16,000	.00129	.00012	....	....	
17,000	17,000	.00142	.00013	....	....	
18,000	18,000	.00158	.00016	....	....	
19,000	19,000	.00175	.00017	....	....	
20,000	20,000	.00198	.00023	.00055	.00036	
21,000	21,000	.00220	.00022	....	....	
22,000	22,000	.00251	.00031	....	....	
23,000	23,000	.00282	.00031	....	....	
24,000	24,000	.00325	.00043	....	....	
25,000	25,000	.00380	.00055	.00181	.00126	
30,020	30,020	....	....	....	....	Tensile strength.

Fractured at the neck. Appearance, fine granular, gray.

RACER.

No. 5814.

Marks, R 59.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	.0	Initial load.
2,000	2,000	.00007	.00007	....	....	
3,000	3,000	.00012	.00005	....	....	
4,000	4,000	.00019	.00007	....	....	
5,000	5,000	.00026	.00007	....	....	
6,000	6,000	.00032	.00006	....	....	
7,000	7,000	.00039	.00007	....	....	
8,000	8,000	.00047	.00008	....	....	
9,000	9,000	.00055	.00008	....	....	
10,000	10,000	.00062	.00007	.00005	.00005	
11,000	11,000	.00070	.00008	....	....	
12,000	12,000	.00080	.00010	....	....	
13,000	13,000	.00090	.00010	....	....	
14,000	14,000	.00100	.00010	....	....	
15,000	15,000	.00110	.00010	.00017	.00012	
16,000	16,000	.00122	.00012	....	....	
17,000	17,000	.00136	.00014	....	....	
18,000	18,000	.00150	.00014	....	....	
19,000	19,000	.00168	.00018	....	....	
20,000	20,000	.00189	.00021	.00049	.00032	
21,000	21,000	.00212	.00023	....	....	
22,000	22,000	.00239	.00027	....	....	
23,000	23,000	.00268	.00029	....	....	
24,000	24,000	.00310	.00042	....	....	
25,000	25,000	.00348	.00038	.00158	.00109	
30,650	30,650	....	....	....	....	Tensile strength.

Fractured ''.7 from neck. Appearance, fine granular, gray.

RACER.

No. 5836.

Marks, R 63.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00012	.00006	....	....	
4,000	4,000	.00019	.00007	....	....	
5,000	5,000	.00027	.00008	....	....	
6,000	6,000	.00032	.00005	....	....	
7,000	7,000	.00040	.00008	....	....	
8,000	8,000	.00049	.00009	....	....	
9,000	9,000	.00056	.00007	....	....	
10,000	10,000	.00065	.00009	.00007	.00007	
11,000	11,000	.00073	.00008	....	....	
12,000	12,000	.00081	.00008	....	....	
13,000	13,000	.00091	.00010	....	....	
14,000	14,000	.00101	.00010	....	....	
15,000	15,000	.00112	.00011	.00016	.00009	
16,000	16,000	.00122	.00010	....	....	
17,000	17,000	.00135	.00013	....	....	
18,000	18,000	.00150	.00015	....	....	
19,000	19,000	.00162	.00012	....	....	
20,000	20,000	.00180	.00018	.00040	.00024	
21,000	21,000	.00198	.00018	....	....	
22,000	22,000	.00215	.00017	....	....	
23,000	23,000	.00240	.00025	....	....	
24,000	24,000	.00268	.00028	....	....	
25,000	25,000	.00298	.00030	.00105	.00065	
31,800	31,800	....	....	....	....	Tensile strength.

Fractured 4″.75 from neck. Appearance, fine granular, gray.

RACER.

No. 5844.

Marks, R 66.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00012	.00006	....	....	
4,000	4,000	.00019	.00007	....	....	
5,000	5,000	.00025	.00006	....	....	
6,000	6,000	.00031	.00006	....	....	
7,000	7,000	.00039	.00008	....	....	
8,000	8,000	.00046	.00007	....	....	
9,000	9,000	.00053	.00007	....	....	
10,000	10,000	.00060	.00007	.00006	.00006	
11,000	11,000	.00069	.00009	....	....	
12,000	12,000	.00078	.00009	....	....	
13,000	13,000	.00088	.00010	....	....	
14,000	14,000	.00098	.00010	....	....	
15,000	15,000	.00108	.00010	.00015	.00009	
16,000	16,000	.00119	.00011	....	....	
17,000	17,000	.00131	.00012	....	....	
18,000	18,000	.00147	.00016	....	....	
19,000	19,000	.00162	.00015	....	....	
20,000	20,000	.00180	.00018	.00042	.00027	
21,000	21,000	.00202	.00022	....	....	
22,000	22,000	.00225	.00023	....	....	
23,000	23,000	.00250	.00025	....	....	
24,000	24,000	.00286	.00036	....	....	
25,000	25,000	.00329	.00043	.00142	.00100	
30,750	30,750	....	....	....	....	Tensile strength.

Fractured 3″ from neck. Appearance, fine granular, gray.

RACER.

No. 5854.

Marks, R 70.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00006	.00006	....	....	
3,000	3,000	.00011	.00005	....	....	
4,000	4,000	.00018	.00007	....	....	
5,000	5,000	.00024	.00006	....	....	
6,000	6,000	.00030	.00006	....	....	
7,000	7,000	.00036	.00006	....	....	
8,000	8,000	.00041	.00005	....	....	
9,000	9,000	.00048	.00007	....	....	
10,000	10,000	.00056	.00008	.00005	.00005	
11,000	11,000	.00062	.00006	....	....	
12,000	12,000	.00069	.00007	....	....	
13,000	13,000	.00078	.00009	....	....	
14,000	14,000	.00087	.00009	....	....	
15,000	15,000	.00096	.00009	.00009	.00004	
16,000	16,000	.00103	.00007	....	....	
17,000	17,000	.00113	.00010	....	....	
18,000	18,000	.00123	.00010	....	....	
19,000	19,000	.00136	.00013	....	....	
20,000	20,000	.00148	.00012	.00024	.00015	
21,000	21,000	.00160	.00012	....	....	
22.000	22,000	.00173	.00013	....	....	
23,000	23,000	.00189	.00016	....	....	
24,000	24,000	.00208	.00019	....	....	
25,000	25,000	.00230	.00022	....	....	
26,000	26,000	.00255	.00025	.00080	.00056	
32,710	32,710	....	....	....	....	Tensile strength.

Fractured 1''.3 from neck. Appearance, granular, gray.

RACER.

No. 5860.

Marks, R 72.
Diameter, 1''.129.
Sectional area, 1.00 square inch.
Length of stem, 10''.
Gauged length, 10''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00007	.00007	....	....	
3,000	3,000	.00014	.00007	....	....	
4,000	4,000	.00020	.00006	....	....	
5,000	5,000	.00026	.00006	....	....	
6,000	6,000	.00032	.00006	....	....	
7.000	7,000	.00040	.00008	....	....	
8,000	8,000	.00047	.00007	....	....	
9.000	9,000	.00054	.00007	....	....	
10,000	10,000	.00062	.00008	.00005	.00005	
11,000	11,000	.00070	.00008	....	....	
12,000	12,000	.00080	.00010	....	....	
13,000	13,000	.00090	.00010	....	....	
14,000	14,000	.00098	.00008	....	....	
15,000	15,000	.00107	.00009	.00011	.00006	
16,000	16,000	.00115	.00008	....	....	
17,000	17,000	.00126	.00011	....	....	
18,000	18,000	.00136	.00010	....	....	
19,000	19,000	.00148	.00012	....	....	
20,000	20,000	.00160	.00012	.00025	.00014	
21,000	21,000	.00172	.00012	....	....	
22,000	22,000	.00190	.00018	....	....	
23,000	23,000	.00204	.00014	....	....	
24.000	24,000	.00223	.00019	....	....	
25,000	25,000	.00242	.00019	.00061	.00036	
26,000	26,000	.00270	.00028	.00077	.00016	
31,020	31,020	....	....	....	....	Tensile strength.

Fractured at the neck. Appearance, fine granular, light gray.

RACER.

No. 5869.

Marks, R 76.
Diameter, 1″.129.
Sectional area, 1.00 square inch.
Length of stem, 10″.
Gauged length, 10″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
1,000	1,000	0.	0.	0.	0.	Initial load.
2,000	2,000	.00008	.00008	....	....	
3,000	3,000	.00014	.00006	....	....	
4,000	4,000	.00020	.00006	....	....	
5,000	5,000	.00028	.00008	....	....	
6,000	6,000	.00037	.00009	....	....	
7,000	7,000	.00045	.00008	....	....	
8,000	8,000	.00053	.00008	....	....	
9,000	9,000	.00061	.00008	....	....	
10,000	10,000	.00070	.00009	.00008	.00008	
11,000	11,000	.00079	.00009	....	....	
12,000	12,000	.00090	.00011	....	....	
13,000	13,000	.00100	.00010	....	....	
14,000	14,000	.00112	.00012	....	....	
15,000	15,000	.00124	.00012	.00021	.00013	
16,000	16,000	.00137	.00013	....	....	
17,000	17,000	.00151	.00014	....	....	
18,000	18,000	.00169	.00018	....	....	
19,000	19,000	.00192	.00023	....	....	
20,000	20,000	.00219	.00027	.00069	.00048	
21,000	21,000	.00240	.00021	....	....	
22,000	22,000	.00279	.00039	....	....	
23,000	23,000	.00314	.00035	....	....	
24,000	24,000	.00374	.00060	....	....	
25,000	25,000	.00430	.00056	.00230	.00161	
29,320	29,320	....	....	....	....	Tensile strength.

Fractured 3″ from neck. Appearance, granular, gray.

CAST IRON AND PIG IRONS.

CAST IRON

FROM

WATERTOWN ARSENAL FOUNDRY

AND

PIG IRONS.

CAST IRON AND PIG IRONS.

The specimens of cast iron were taken from cylinders 18 inches long by 8 inches diameter, cored 3½ inches diameter, poured from the same metal as the castings they represented.

Specimens of pig iron were turned down directly from sample pigs.

The furnace charges were as follows:

The heads referred to in the furnace charges were heads of shell from previous casts.

The scrap iron used was old shot and shell, bolsters, and gun-carriage scrap of good quality.

Date of cast.	Furnace charge.	*Pounds.*	Furnace.	No. of tension test.
July 3, 1897	Salisbury pig	3,000	Cupola	5472
	Soft pig	1,000		
	Heads	4,000		
	Scrap	2,000		
	Total	10,000		
July 13, 1897	Salisbury pig	4,000	Cupola	5480
	Soft pig	1,500		
	Heads	4,000		
	Scrap	3,500		
	Total	13,000		
July 16, 1897	Salisbury pig	4,500	Cupola	5481
	Soft pig	2,000		
	Heads	4,500		
	Scrap	5,000		
	Total	16,000		
July 22, 1897	Salisbury pig	4,500	Cupola	5482
	Soft pig	2,000		
	Heads	4,500		
	Scrap	5,000		
	Total	16,000		
July 27, 1897	Muirkirk pig No. 4, high	6,100	Air furnace	5483 5484
	Salisbury pig No. 4, high	6,800		
	Soft pig	6,600		
	Total	19,500		
	Muirkirk pig	2,000	Cupola	
	Salisbury pig	5,000		
	Soft pig	2,000		
	Heads	4,000		
	Scrap	5,000		
	Total	18,000		
August 4, 1897	Salisbury pig	4,500	Cupola	5485
	Soft pig	2,000		
	Heads	4,000		
	Scrap	2,000		
	Total	12,500		
August 12, 1897	Salisbury pig	2,500	Cupola	5489
	Soft pig	1,500		
	Heads	3,800		
	Scrap	4,200		
	Total	12,000		

Cast iron and pig irons—Continued.

Date of cast.	Furnace charge.	Pounds.	Furnace.	No. of tension test.
August 21, 1897	Salisbury pig	4,000	Cupola	5491 5501
	Soft pig	1,500		
	Heads	3,800		
	Scrap	2,700		
	Total	12,000		
August 31, 1897	Salisbury pig	4,000	Cupola	5497 5498
	Soft pig	2,000		
	Heads	3,800		
	Scrap	4,200		
	Total	14,000		
August 26, 1897	Salisbury pig	4,000	Cupola	5502
	Soft pig	1,500		
	Heads	3,800		
	Scrap	2,700		
	Total	12,000		
September 8, 1897	Muirkirk pig No. 4, high	3,100	Air furnace	5503 5504 5505
	Muirkirk pig No. 4, low	3,000		
	Salisbury pig	6,800		
	Soft pig	6,600		
	Total	19,500		
	Muirkirk pig	2,000	Cupola	
	Salisbury pig	6,000		
	Soft pig	2,000		
	Heads	3,800		
	Scrap	3,000		
	Total	16,800		
September 8, 1897	Salisbury pig	4,000	Cupola	5506
	Soft pig	1,500		
	Heads	3,800		
	Scrap	6,500		
	Total	15,800		
September 11, 1897	Salisbury pig	2,000	Cupola	5508
	Soft pig	1,000		
	Heads	2,000		
	Scrap	3,000		
	Total	8,000		
September 15, 1897	Salisbury pig	2,000	Cupola	5509
	Soft pig	1,500		
	Heads	2,000		
	Scrap	4,500		
	Total	10,000		
September 18, 1897	Salisbury pig	500	Cupola	5515
	Soft pig	1,000		
	Scrap	2,000		
	Total	3,500		
September 22, 1897	Muirkirk pig No. 4, high	3,500	Air furnace	5514 5516
	Muirkirk pig No. 4	3,000		
	Salisbury pig	4,500		
	Rebecca pig	4,000		
	Total	15,000		
	Muirkirk pig	1,000	Cupola	
	Salisbury pig	1,000		
	Soft pig	1,000		
	Scrap	3,500		
	Total	6,500		

Cast iron and pig irons—Continued.

Date of cast.	Furnace charge.		Furnace.	No. of tension test.
		Pounds.		
September 25, 1897	Salisbury pig	500	Cupola	5517
	Soft pig	1,000		
	Heads	2,000		
	Scrap	3,000		
	Total	6,500		
September 30, 1897	Muirkirk pig No. 4, high	3,300	Air furnace	5518 5519
	Muirkirk pig No. 4, low	3,200		
	Salisbury pig	7,000		
	Soft pig	6,000		
	Total	19,500		
	Salisbury pig	4,000	Cupola	
	Soft pig	2,000		
	Heads	3,000		
	Scrap	3,000		
	Total	12,000		
October 4, 1897	Salisbury pig	500	Cupola	5522
	Soft pig	1,000		
	Heads	2,000		
	Scrap	2,500		
	Total	6,000		
October 7, 1897	Salisbury pig	500	Cupola	5526
	Soft pig	1,000		
	Heads	2,000		
	Scrap	1,500		
	Total	5,000		
October 11, 1897	Muirkirk pig No. 4, low	2,800	Air furnace	5527 5528
	Muirkirk pig No. 4, high	3,200		
	Salisbury pig	4,300		
	Rebecca pig	3,700		
	Total	14,000		
	Muirkirk pig	1,000	Cupola	
	Salisbury pig	500		
	Soft pig	1,000		
	Heads	2,500		
	Scrap	2,000		
	Total	7,000		
October 14, 1897	Salisbury pig	500	Cupola	5529
	Soft pig	1,000		
	Heads	2,000		
	Scrap	1,500		
	Total	5,000		
October 18, 1897	Muirkirk pig No. 4, high	3,300	Air furnace	5530 5531
	Muirkirk pig No. 4, low	3,200		
	Salisbury pig	7,000		
	Soft pig	6,000		
	Total	19,500		
	Salisbury pig	4,000	Cupola	
	Muirkirk pig	2,000		
	Soft pig	2,000		
	Heads	3,000		
	Scrap	3,500		
	Total	14,500		
October 21, 1897	Salisbury pig	500	Cupola	5532
	Soft pig	1,000		
	Heads	1,500		
	Scrap	2,000		
	Total	5,000		

Cast iron and pig irons—Continued.

Date of cast.	Furnace charge.		Furnace.	No. of tension test.
		Pounds.		
October 27, 1897	Muirkirk pig No. 4, low	2, 800	Air furnace	5533 5534 5535
	Muirkirk pig No. 4, high	3, 200		
	Salisbury pig	4, 300		
	Rebecca pig	3, 700		
	Total	14, 000		
	Muirkirk pig	3, 000	Cupola	
	Salisbury pig	4, 000		
	Soft pig	2, 000		
	Heads	2, 000		
	Scrap	2, 000		
	Total	13, 000		
November 4, 1897	Muirkirk pig No. 4, high	3, 500	Air furnace	5537 5538
	Muirkirk pig No. 4, low	3, 500		
	Salisbury pig	7, 000		
	Soft pig	5, 500		
	Total	19, 500		
	Muirkirk pig	4, 000	Cupola	
	Salisbury pig	5, 000		
	Soft pig	2, 000		
	Heads	3, 000		
	Scrap	5, 000		
	Total	19, 000		
November 11, 1897	Salisbury pig	2, 000	Air furnace	5539
	Soft pig	3, 000		
	Heads	3, 000		
	Scrap	14, 000		
	Total	22, 000		
November 15, 1897	Muirkirk pig No. 4, high	3, 200	Air furnace	5540
	Muirkirk pig No. 4, low	3, 200		
	Salisbury pig	4, 500		
	Soft pig	3, 100		
	Total	14, 000		
	Muirkirk pig	3, 000	Cupola	
	Salisbury pig	4, 000		
	Soft pig	1, 000		
	Scrap	4, 000		
	Total	12, 000		
November 18, 1897	Salisbury pig	2, 000	Cupola	5541
	Soft pig	1, 000		
	Heads	2, 000		
	Scrap	5, 000		
	Total	10, 000		
November 27, 1897	Muirkirk pig No. 4, high	2, 800	Air furnace	5542 5543
	Muirkirk pig No. 4, low	2, 700		
	Salisbury pig	4, 500		
	Soft pig	3, 000		
	Total	13, 000		
	Muirkirk pig	1, 000	Cupola	
	Salisbury pig	5, 000		
	Soft pig	3, 000		
	Heads	1, 500		
	Scrap	2, 000		
	Total	12, 500		
December 4, 1897	Salisbury pig	1, 200	Cupola	5544
	Soft pig	3, 000		
	Scrap	7, 500		
	Total	11, 700		

Cast iron and pig irons—Continued.

Date of cast.	Furnace charge.		Furnace.	No. of tension test.
		Pounds.		
December 11, 1897	Salisbury pig	1,000	Cupola	5546
	Soft pig	1,000		
	Heads	2,000		
	Scrap	1,000		
	Total	5,000		
December 15, 1897	Salisbury pig	1,000	Cupola	5547
	Soft pig	1,000		
	Heads	2,000		
	Scrap	2,000		
	Total	6,000		
December 22, 1897	Salisbury pig	1,000	Cupola	5549
	Soft pig	1,000		
	Heads	2,000		
	Scrap	1,000		
	Total	5,000		
January 12, 1898	Muirkirk pig	8,000	Air furnace	5552 5553
	Salisbury pig	7,000		
	Soft pig	4,500		
	Total	19,500		
	Muirkirk pig	4,000	Cupola	
	Salisbury pig	5,000		
	Soft pig	1,000		
	Heads	2,000		
	Scrap	3,000		
	Total	15,000		
January 22, 1898	Salisbury pig	1,500	Cupola	5560
	Soft pig	1,500		
	Scrap	3,000		
	Total	6,000		
January 28, 1898	Salisbury pig	1,500	Cupola	5562
	Soft pig	1,500		
	Scrap	3,000		
	Total	6,000		
February 8, 1898	Salisbury pig	1,500	Cupola	5564
	Soft pig	1,500		
	Scrap	3,500		
	Total	6,500		
February 23, 1898	Salisbury pig	1,500	Cupola	5572
	Soft pig	1,500		
	Scrap	3,000		
	Total	6,000		
March 6, 1898	Salisbury pig	1,500	Cupola	5577
	Soft pig	1,500		
	Scrap	3,500		
	Total	6,500		
March 7, 1898	Salisbury pig	1,500	Cupola	5578
	Soft pig	1,500		
	Scrap	3,000		
	Total	6,000		
March 8, 1898	Salisbury pig	1,500	Cupola	5582
	Soft pig	1,500		
	Scrap	3,000		
	Total	6,000		

Cast iron and pig irons—Continued.

Date of cast.	Furnace charge.		Furnace.	No. of tension test.
		Pounds.		
March 18, 1898	Salisbury pig	1,500	Cupola	5583 5585
	Soft pig	1,500		
	Scrap	3,000		
	Total	6,000		
March 22, 1898	Salisbury pig	1,500	Cupola	5586 5587
	Soft pig	1,500		
	Scrap	3,000		
	Total	6,000		
March 25, 1898	Salisbury pig	1,500	Cupola	5588
	Soft pig	1,500		
	Scrap	3,000		
	Total	6,000		
April 4, 1898	Salisbury pig	1,500	Cupola	5591
	Soft pig	1,500		
	Scrap	3,000		
	Total	6,000		
April 6, 1898	Salisbury pig	1,500	Cupola	5596
	Soft pig	1,500		
	Scrap	3,000		
	Total	6,000		
April 11, 1898	Salisbury pig	1,500	Cupola	5602
	Soft pig	1,500		
	Scrap	3,000		
	Total	6,000		
April 28, 1898	Muirkirk pig	500	Cupola	5607
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
May 2, 1898	Muirkirk pig	500	Cupola	5608
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
May 3, 1898	Muirkirk pig	500	Cupola	5613
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
May 4, 1898	Muirkirk pig	500	Cupola	5617
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
May 13, 1898	Muirkirk pig	500	Cupola	5625
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
May 14, 1898	Muirkirk pig	500	Cupola	5626
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		

Cast iron and pig irons—Continued.

Date of cast.	Furnace charge.	Pounds.	Furnace.	No. of tension test.
May 16, 1898	Muirkirk pig	500	Cupola	5627
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
May 18, 1898	Muirkirk pig	500	Cupola	5038 5639
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
May 19, 1898	Muirkirk pig	500	Cupola	5640
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
May 23, 1898	Muirkirk pig	500	Cupola	5347
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
May 24, 1898	Muirkirk pig	500	Cupola	5648
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
May 27, 1898	Muirkirk pig	500	Cupola	5650
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
May 25, 1898	Muirkirk pig	500	Cupola	5653
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
May 28, 1898	Muirkirk pig	500	Cupola	5654
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
May 29, 1898	Muirkirk pig	500	Cupola	5655
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
May 31, 1898	Muirkirk pig	500	Cupola	5656
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
June 3, 1898	Muirkirk pig	500	Cupola	5658
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		

Cast iron and pig irons—Continued.

Date of cast.	Furnace charge.	Pounds.	Furnace.	No. of tension test.
June 4, 1898	Muirkirk pig	500	Cupola	5659
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
June 6, 1898	Muirkirk pig	500	Cupola	5663
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
June 7, 1898	Muirkirk pig	500	Cupola	5664
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
June 8, 1898	Muirkirk pig	500	Cupola	5665
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
June 9, 1898	Muirkirk pig	500	Cupola	5666
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
June 10, 1898	Muirkirk pig	500	Cupola	5667
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
June 13, 1898	Muirkirk pig	500	Cupola	5668
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
June 16, 1898	Muirkirk pig	500	Cupola	5671
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
June 20, 1898	Muirkirk pig	500	Cupola	5679
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
June 21, 1898	Muirkirk pig	500	Cupola	5680
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
June 24, 1898	Muirkirk pig	500	Cupola	5682
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		

Cast iron and pig irons—Continued.

Date of cast.	Furnace charge.		Furnace.	No. of tension test.
		Pounds.		
June 25, 1898	Muirkirk pig	500	Cupola	5683
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
June 27, 1898	Muirkirk pig	500	Cupola	5684
	Salisbury pig	1,500		
	Soft pig	250		
	Scrap	1,750		
	Total	4,000		
June 30, 1897	Muirkirk pig	4,500	Air furnace	5471
	Salisbury pig	2,500		
	Rebecca pig	2,500		
	Total	9,500		
August 18, 1897	Muirkirk pig	5,300	Air furnace	5490
	Salisbury pig	4,500		
	Rebecca pig	3,200		
	Total	13,000		
November 27, 1897	Muirkirk pig	5,500	Air furnace	5542
	Salisbury pig	4,500		
	Soft pig	3,000		
	Total	13,000		
December 18, 1897	Muirkirk pig	5,500	Air furnace	5548
	Salisbury pig	4,500		
	Soft pig	3,000		
	Total	13,000		
March 18, 1898	Muirkirk pig	5,500	Air furnace	5584
	Salisbury pig	4,500		
	Soft pig	3,000		
	Total	13,000		
April 4, 1898	Muirkirk pig	5,500	Air furnace	5595
	Salisbury pig	4,500		
	Soft pig	3,000		
	Total	13,000		
April 27, 1898	Muirkirk pig	5,800	Air furnace	5606
	Salisbury pig	5,500		
	Soft pig	3,500		
	Scrap	1,500		
	Total	16,300		
June 15, 1898	Muirkirk pig	5,500	Air furnace	5670
	Salisbury pig	5,000		
	Soft pig	4,000		
	Scrap	1,500		
	Total	16,000		
September 12, 1897	Muirkirk pig	6,500	Air furnace	5514
	Salisbury pig	4,500		
	Rebecca pig	4,000		
	Total	15,000		
October 11, 1897	Muirkirk pig	6,000	Air furnace	5527
	Salisbury pig	4,300		
	Rebecca pig	3,700		
	Total	14,000		

Cast iron and pig irons—Continued.

Date of cast.	Furnace charge.		Furnace.	No. of tension test.
		Pounds.		
October 27, 1897	Muirkirk pig	6,000	Air furnace	5534
	Salisbury pig	4,300		
	Rebecca pig	3,700		
	Total	14,000		
November 15, 1897	Muirkirk pig	6,400	Air furnace	5510
	Salisbury pig	4,500		
	Soft pig	3,100		
	Total	14,000		
December 8, 1897	Muirkirk pig	6,400	Air furnace	5515
	Salisbury pig	4,500		
	Soft pig	3,100		
	Total	14,000		
April 19, 1898	Muirkirk pig	5,800	Air furnace	5605
	Salisbury pig	5,500		
	Soft pig	3,500		
	Scrap	1,500		
	Total	16,300		
June 23, 1897	Muirkirk pig	6,000	Air furnace	5470
	Salisbury pig	6,000		
	Rebecca pig	4,000		
	Total	16,000		
	Muirkirk pig	2,000	Cupola	
	Salisbury pig	6,000		
	Heads	3,800		
	Scrap	2,500		
	Total	14,300		
July 19, 1897	Muirkirk pig	6,000	Air furnace	5479
	Salisbury pig	6,000		
	Rebecca pig	4,000		
	Total	16,000		
	Muirkirk pig	2,000	Cupola	
	Salisbury pig	6,500		
	Heads	3,800		
	Scrap	4,700		
	Total	17,000		
August 10, 1897	Muirkirk pig	6,000	Air furnace	5487
	Salisbury pig	6,000		
	Rebecca pig	4,000		
	Total	16,000		
	Salisbury pig	5,000	Cupola	
	Soft pig	2,000		
	Heads	3,800		
	Scrap	3,200		
	Total	14,000		
December 30, 1897	Muirkirk pig	6,500	Air furnace	5551
	Salisbury pig	6,500		
	Soft pig	3,000		
	Total	16,000		
	Muirkirk pig	1,500	Cupola	
	Salisbury pig	5,000		
	Soft pig	1,000		
	Heads	3,000		
	Scrap	2,000		
	Total	12,500		

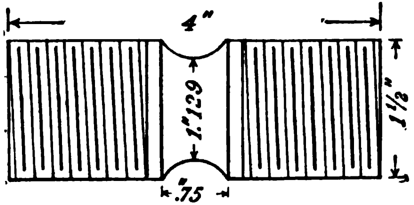
Cast iron and pig irons—Continued.

Date of cast.	Furnace charge.		Furnace.	No. of tension test.
		Pounds.		
January 25, 1898	Muirkirk pig	6,500	Air furnace	5561
	Salisbury pig	6,500		
	Soft pig	3,000		
	Total	16,000		
	Muirkirk pig	1,500	Cupola	
	Salisbury pig	5,000		
	Soft pig	1,500		
	Heads	3,000		
	Scrap	2,500		
	Total	13,500		
February 15, 1898	Muirkirk pig	6,500	Air furnace	5567
	Salisbury pig	6,500		
	Soft pig	3,000		
	Total	16,000		
	Muirkirk pig	1,500	Cupola	
	Salisbury pig	3,000		
	Soft pig	3,000		
	Heads	5,500		
	Scrap	3,000		
	Total	16,000		
March 8, 1898	Muirkirk pig	6,500	Air furnace	5579
	Salisbury pig	6,500		
	Soft pig	3,000		
	Total	16,000		
	Muirkirk pig	1,500	Cupola	
	Salisbury pig	3,000		
	Soft pig	500		
	Heads	3,000		
	Scrap	2,500		
	Total	10,500		
February 4, 1898	Muirkirk pig	8,000	Air furnace	5563
	Salisbury pig	7,000		
	Soft pig	4,500		
	Total	19,500		
	Muirkirk pig	4,000	Cupola	
	Salisbury pig	5,000		
	Soft pig	1,000		
	Heads	2,000		
	Scrap	2,000		
	Total	14,000		
May 12, 1898	Salisbury pig	8,750	Air furnace	5624
	Muirkirk pig	9,500		
	Soft pig	6,250		
	Scrap	2,000		
	Total	26,500		
June 18, 1898	Salisbury pig	8,750	Air furnace	5673
	Muirkirk pig	9,500		
	Soft pig	6,250		
	Scrap	2,000		
	Total	26,500		
August 27, 1897	Muirkirk pig	3,500	Air furnace	5496
	Salisbury pig	3,500		
	Soft pig	3,000		
	Remelted pig	1,000		
	Total	11,000		
	Muirkirk pig	1,000	Cupola	
	Salisbury pig	3,500		
	Soft pig	1,500		
	Heads	3,800		
	Total	9,800		

Cast iron and pig irons—Continued.

Date of cast.	Furnace charge.		Furnace.	No. of tension test.
		Pounds.		
February 25, 1898	Muirkirk pig	3,500	Air furnace	5576
	Salisbury pig	3,500		
	Soft pig	3,000		
	Remelted pig	1,000		
	Total	11,000		
	Salisbury pig	1,500	Cupola	
	Soft pig	1,500		
	Scrap	3,000		
	Total	6,000		
April 6, 1898	Muirkirk pig	2,750	Air furnace	5597
	Salisbury pig	5,750		
	Soft pig	2,250		
	Scrap	5,750		
	Total	16,500		
May 2, 1898	Muirkirk pig	2,750	Air furnace	5610
	Salisbury pig	5,750		
	Soft pig	2,250		
	Scrap	5,750		
	Total	16,500		
June 14, 1898	Muirkirk pig	2,750	Air furnace	5669
	Salisbury pig	5,750		
	Soft pig	2,250		
	Scrap	5,750		
	Total	16,500		

CHEMICAL ANALYSES AND TENSION TESTS.



Cast iron from Watertown Arsenal Foundry.

No. of test.	Description.	Date of cast.	Chemical composition.								Tensile strength per square inch.	Fracture.	Specific gravity.
			Carbon.			Manganese.	Silicon.	Sulphur.	Phosphorus.	Copper.			
			Total.	Graphitic.	Combined.								
		1897.									*Pounds.*		
5472	12" shell	July 8									29,200	Granular, light gray, granitic	7.1904
5480	8" shot	July 13									28,910	Granular, light gray, mottled	7.2364
5481	do	July 16									28,610	do	7.2339
5482	8" shot and 12" shell	July 22									29,960	do	7.2372
5483	do	July 27									30,990	do	7.2045
5485	do	Aug. 4	3.654	2.331	1.323	0.324	0.880	0.095	0.442		28,120	Fine granular, light gray, granitic	7.2363
5489	do	Aug. 12	3.792	2.727	1.065	0.258	0.740	0.111	0.482		27,940	do	7.2006
5491	do	Aug. 21									27,520	Fine granular, granitic	7.2385
5497	do	Aug. 31									27,680	Fine granular, light gray, granitic	7.1864
5498	3".2 shell	do									24,700	Fine granular, dark gray	7.1067
5501	do	Aug. 21									29,710	Fine granular, gray	7.1379
5502	do	Aug. 26									26,640	do	7.2345
5503	8" shot and 12" shell	Sept. 8									29,450	Fine granular, mottled	7.1842
5505	3".2 shell	do									26,030	Fine granular, dark gray	7.1727
5506	do	Sept. 3									27,310	Fine granular, gray	7.1502
5508	do	Sept. 11									28,520	do	7.2377
5509	8" shot	Sept. 15									29,970	do	7.1852
5515	3".2 shell	Sept. 18									28,150	do	7.1327

Cast iron from Watertown Arsenal Foundry—Continued.

No. of test.	Description.	Date of cast.	Chemical composition.								Tensile strength per square inch.	Fracture.	Specific gravity.
			Carbon.			Man-ga-nese.	Sili-con.	Sul-phur.	Phos-phorus.	Copper.			
			Total.	Graph-itic.	Com-bined.								
		1897.									*Pounds.*		
5516	3''.2 shell	Sept. 22									30, 320	Fine granular, gray	7. 1301
5517	.....do	Sept. 25									30, 990	.....do	7. 1149
5518	.....do	Sept. 30									27, 300	Fine granular, light gray	7. 1359
5522	.....do	Oct. 4									28, 250	Fine granular, gray	7. 0642
5526	.....do	Oct. 7	3. 299	2. 257	1. 042	0. 351	1. 316	0. 107	0. 356		26, 920	.....do	7. 1219
5528	.....do	Oct. 11									27, 580	Granular, variable gray	7. 1183
5529	.....do	Oct. 14									31, 580	Fine granular, light gray	7. 1677
5530	.....do	Oct. 18									30, 320	Granular, variable gray	7. 0903
5532	.....do	Oct. 21									27, 920	.....do	7. 0890
5533	.....do	Oct. 27									27, 110	Granular, gray	7. 1429
5535	12'' shot	....do									27, 730	Granular, mottled	7. 1274
5537	.....do	Nov. 4									29, 200	Granular, light gray	7. 1494
5539	.....do	Nov. 11									27, 810	Granular, gray, mottled	7. 1580
5541	.....do	Nov. 18									28, 980	Granular, mottled	7. 1869
5543	12'' shot and 5'' shell	Nov. 27									30, 300	Granular, gray	7. 1645
5544	5'' shell	Dec. 4									29, 250	.....do	7. 1687
5646	.....do	Dec. 11									29, 570	Granular, mottled	7. 1566
5547	.....do	Dec. 15									28, 620	.....do	7. 1616
5549	.....do	Dec. 22									33, 150	Granular, light gray	7. 1534
		1898.											
5553	.....do	Jan. 12									27, 800	Granular, mottled	7. 1888
5560	3'' shell	Jan. 22									28, 700	.....do	7. 2006
5562	5'' shell	Jan. 28									30, 020	.....do	7. 1862
5564	.....do	Feb. 8									28, 710	.....do	7. 2877
5572	.....do	Feb. 23									26, 710	.....do	7. 2214
5577	.....do	Mar. 6									28, 690	.....do	7. 2259
5578	.....do	Mar. 7									28, 180	Granular, gray	7. 1810
5582	.....do	Mar. 8									27, 100	Fine granular, mottled	7. 2169
5583	6'' shot	Mar. 18									26, 910	Granular, gray	7. 3073
5585	3'' shell	....do									24, 960	Granular, dark gray	7. 0886
5586	3''.2 shell	Mar. 22									24, 980	Granular, gray	7. 1462
5587	6'' shot	....do									28, 660	Granular, mottled	7. 1673
5588	3''.2 shell	Mar. 25									24, 620	Granular, gray	7. 1761
5591	6'' shot	Apr. 4									27, 100	Granular, light gray	7. 1822
5596	.....do	Apr. 6									26, 710	Granular, gray	7. 3136
5602	3''.2 shell	Apr. 11									23, 520	Fine granular, gray	7. 1474

5607	do	Apr. 28									25,690	Granular, gray	7.1252
5608	do	May 2									22,960	do	7.1406
5613	do	May 3									24,660	do	7.1389
5617	do	May 4									22,340	do	7.1197
5625	do	May 13									22,210	do	7.1278
5626	do	May 14									24,820	do	7.1579
5627	do	May 16									24,660	do	7.1687
5638	do	May 18									22,400	Granular	7.1629
5639	do	do									25,710	do	7.1312
5640	do	May 19									20,420	Granular, coarse spangles, gray	7.1402
5647	do	May 23									25,320	Granular, gray	7.1214
5648	do	May 24									25,280	do	7.1318
5650	do	May 27									26,710	do	7.1473
5653	do	May 25									25,420	do	7.1443
5654	do	May 28									24,750	do	7.1150
5655	do	May 29									25,310	do	7.1404
5656	do	May 31									28,620	do	7.1582
5658	do	June 3									22,590	do	7.1202
5659	do	June 4									23,980	do	7.1945
5663	do	June 6									22,110	do	7.0789
5664	do	June 7									22,800	do	7.1872
5665	do	June 8									24,720	do	7.0440
5666	do	June 9									23,420	do	7.1597
5667	do	June 10									24,410	do	7.0831
5668	do	June 13									22,100	do	7.1193
5671	do	June 16									27,480	do	7.1290
5679	do	June 20									23,420	do	7.0778
5680	do	June 21									26,410	do	7.1714
5682	do	June 24									22,980	do	7.2315
5683	do	June 25									22,360	do	7.2161
5684	do	June 27									29,150	Fine granular, light gray	7.1811
5471	8-inch top disappearing carriage.	1897. June 30	3.174	2.506	0.668	0.458	1.220	0.073	0.390		33,510	Fine granular, gray	7.1493
5490	10-inch top disappearing carriage.	Aug. 18									35,800	Fine granular, mottled	7.2210
5542		Nov. 27									35,620	Granular, gray	7.1883
5548	do	Dec. 18									28,300	Granular, light gray	7.1297
5550	do	do									27,100	Granular, mottled	7.1540
5584	do	1898. Mar. 18									34.950	Granular, gray	7.1896
5595	do	Apr. 4									34,500	Granular, light gray, silvery luster	7.1589
5598	do	do									34,510	do	7.3182
5606	do	Apr. 27									34,310	Fine granular, mottled	7.2239
5670	do	June 15									32,730	Granular, light gray	7.1872
5514	½ bottom rolled path 10-inch disappearing carriage.	1897. Sept. 12									33,370	Fine granular, silvery luster	7.1803
5527	do	Oct. 11									32,140	Fine granular, gray	7.1792
5534	do	Oct. 27									35,340	Granular, mottled	7.1922
5540	do	Nov. 15									32,970	Granular, light gray	7.2187
5545	do	Dec. 8									34,800	Granular, gray	7.1724

Cast iron from Watertown Arsenal Foundry—Continued.

No. of test.	Description.	Date of cast.	Chemical composition.								Tensile strength per square inch.	Fracture.	Specific gravity.
			Carbon.			Man-ga-nese.	Sili-con.	Sul-phur.	Phos-phorus.	Copper.			
			Total.	Graph-itic.	Com-bined.						Pounds.		
5605	½ bottom rolled path 10-inch disappearing carriage.	1898. Apr. 19									34,380	Fine granular, light gray	7.1964
5470	½ bottom roller path 12-inch disappearing carriage.	1897. June 23	2.876	2.675	0.201	0.464	1.085	0.067	0.423		31,800	Fine granular, gray	7.1630
5479	.....do	July 19									37,510	.....do	7.3026
5487	.....do	Aug. 10	2.996	2.290	0.706	0.387	1.175	0.113	0.407		34,970	.....do	7.1768
5551	.....do	Dec. 30									35,850	Granular, light gray	7.2509
5561	.....do	1898. Jan. 25									33,810	Granular, light gray, silvery luster	7.2266
5567	.....do	Feb. 15									36,880	Granular, gray, bright lustrous	7.2095
5579	.....do	Mar. 8									36,570	Granular, gray	7.2106
5484	Side frame 12-inch disappearing carriage.	1897. July 27									34,230	Fine granular, light gray	7.1826
5504	.....do	Sept. 8									29,980	Fine granular, gray	7.1378
5519	.....do	Sept. 30									31,390	Granular, gray	7.1363
5531	.....do	Oct. 18									30,990	Granular, gray, bright facets	7.1106
5538	.....do	Nov. 4									34,420	Granular, light gray	7.1984
5552	.....do	1898. Jan. 12									34,400	.....do	7.2370
5563	.....do	Feb. 4									31,200	Granular, gray	7.2552
5624	.....do	May 12									35,450	Fine granular, light gray	7.2339
5673	.....do	June 15									38,840	Granular, light gray	7.2380
5496	Gun carriage for 5-inch rapid-fire gun.	1897. Aug. 27									32,980	Fine granular, light gray	7.2013
5576	.....do	1898. Feb. 25									31,480	Granular, gray	7.1361
5597	.....do	Apr. 6									34,050	Granular, light gray, silvery luster	7.2068
5610	.....do	May 2									29,810	Granular, gray, silvery luster	7.2028
5669	.....do	June 14									36,690	Granular, light gray	7.2625
5574	With flux										17,900	Granular, varying size of facets	
5575	Without flux										18,450	.....do	

PIG IRONS.

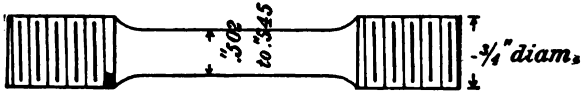
No. of test.	Description.	Chemical composition.								Tensile strength per square inch.	Fracture.	Specific gravity.
		Carbon.			Manganese.	Silicon.	Sulphur.	Phosphorus.	Copper.			
		Total.	Graphitic.	Combined.								
										Pounds.		
5492	Muirkirk pig, No. 4									26,880	Fine granular, gray	7.2246
5494	.....do									30,560	.....do	7.2361
5559	.....do									25,560	Fine granular, light gray	7.1819
5566	.....do									26,350	Fine granular, dark gray	7.2345
5493	Muirkirk pig, No. 4, high									28,710	Fine granular, gray	7.2492
5495	.....do									31,100	.....do	7.1817
5558	.....do									29,410	Fine granular, light gray	7.2327
5500	Salisbury pig									17,500	Fine granular, with coarser grains interspersed.	7.0881
5512	.....do	3.324	2.309	1.625	0.342	0.611	0.025	0.356		27,980	Fine and medium fine granulation interspersed.	7.1757
5513	.....do	2.808	2.208	0.600	0.464	1.880	0.018	0.326		40,650	Fine granular, gray	7.2686
5520	.....do									23,950	Fine and medium fine granulation interspersed.	7.0993
5524	.....do									28,610	Fine granular, gray	
5525	.....do									22,510	Fine and coarse granulation interspersed, gray.	
5565	.....do									35,980	Granular, gray	7.2107
5499	Salisbury pig, No. 4	3.954	2.454	1.500	0.458	0.560	0.025	0.357		28,520	Fine granular, dark gray	7.2092
5511	.....do	3.954	2.440	1.514	0.490	0.752	0.020	0.387		28,480	Fine granular, gray	7.2584
5523	.....do									22,900	Fine and coarse granulation interspersed, gray.	7.1043
5557	.....do	2.836	2.536	0.300	0.400	2.113	0.025	0.249		[1]12,000	Fine granular, dark gray, dull luster	7.0956
5507	Salisbury pig, No. 4, high									21,200	Fine and medium fine granulation interspersed.	7.1364
5510	.....do									23,950	.....do	7.1396
5556	.....do	2.617	1.936	0.881	0.490	1.350	0.020	0.252		42,900	Fine granular, light gray, silvery luster.	7.2697
5589	.....do									31,800	Fine granular, with occasional coarser grains, gray.	7.2645
5590	.....do									32,640	.....do	7.2181
5536	Tonawanda pig, No. 1, soft	3.220	2.675	0.545	0.401	2.096	0.035	0.727		14,920	Granular, varying from coarse to fine	6.8759
5580	Richmond pig, No. 4									18,160	Fine granular, dark gray	
5581	Richmond pig, No. 4½									22,990	.....do	
5674	Rock Run charcoal pig, No. 4	3.416	2.879	0.537	0.430	4.100	0.034	0.437		19,100	Fine and medium granular, gray	
5622	Shelby									16,500	Coarse granular, gray	6.8584
5628	.....do									16,450	.....do	

[1] About.

STEEL BARS, PLAIN AND WELDED.

GUN STEEL AND GAUTIER STEEL.

BETHLEHEM IRON COMPANY'S BILLET 8779 B_2.

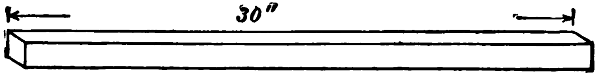


ORDNANCE STEEL NO. 2.

No. of test.	Description.	Elastic limit per square inch.	Tensile strength per square inch.	Elongation in 2 inches.	Contraction of area.	Elongation of inch sections.	Fracture.
		Pounds.	*Pounds.*	*Per cent.*	*Per cent.*	*Inch.*	
9360	Original condition as received from steel makers	47,450	84,550	26.5	43.5	.20, .33*	Silky, slightly lamellar.
9352	Forged, tempered, and annealed at Watertown Arsenal	47,300	79,440	21.0	34.7	.16, .26*	Silky, laminated.
9359	After second treatment	47,900	78,450	26.0	37.0	.21, .31*	Do.
9366	Breech end of forging re-treated and annealed at lower temperature.	57,400	97,050	15.0	24.0	.11, .19*	Granular, laminated spot at circumference.
9367	Middle of forging treated same as No. 9366	58,690	99,190	15.0	33.3	.15, *.15	Granular, with streak of lamination.

ORDNANCE STEEL NO. 3. MARKED X-4591.

9361	After treatment at Watertown Arsenal	61,900	108,350	18.0	37.0	.12, .24*	Granular, 50 per cent; silky center, 50 per cent.



ORDNANCE STEEL NO. 3.

No. of test.	Description.	Dimensions.		Sectional area.	Tensile strength.		Fracture.
		Width.	Thickness.		Total.	Per square inch.	
		Inches.	*Inches.*	*Sq. in.*	*Pounds.*	*Pounds.*	
9387	Plain bar	1.28	1.27	1.63	161,300	98,960	Fine granular, radiating from a dull silky spot at corner of bar.
9388	Scarf weld with special flux.	1.26	1.26	1.58	105,900	67,030	Fine granular, radiating from a dark spongy spot at corner of bar. Bar did not fracture at the weld.
9389	.....do	1.27	1.27	1.61	86,800	53,910	Do.

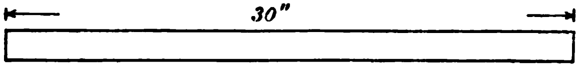
ORDNANCE STEEL NO. 2. ANNEALED BEFORE TESTING.

No. of test.	Description.	Width.	Thickness.	Sectional area.	Total.	Per square inch.	Fracture.
9390	Plain bar	1.26	1.27	1.60	130,300	81,440	Fine silky.
9391	Scarf weld	1.30	1.29	1.68	127,700	76,010	Fracture followed scarf weld. Length of scarf 7¼".
9392	.....do	1.28	1.28	1.64	128,100	78,110	Fracture followed scarf weld. Length of scarf 7¼".

ORDNANCE STEEL NO. 3. ANNEALED BEFORE TESTING.

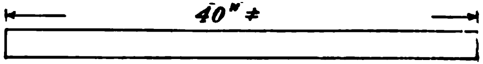
No. of test.	Description.	Width.	Thickness.	Sectional area.	Total.	Per square inch.	Fracture.
9393	Plain bar	1.28	1.27	1.63	161,500	99,080	Fine granular, radiating from a silky center.
9394	Scarf weld	1.28	1.28	1.64	134,300	81,890	Fracture followed scarf weld. Length of scarf 4¼".
9395	.....do	1.31	1.27	1.66	99,800	60,120	Fracture followed scarf weld. Length of scarf 4¼".

GAUTIER STEEL ROUND BARS, ANNEALED BEFORE TESTING.



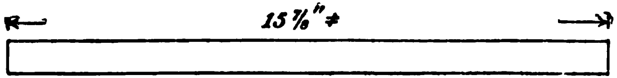
No. of test.	Description.	Per cent carbon.	Diameter.	Sectional area.	Tensile strength.		Elongation in 10 inches.		Area at fracture.	Contraction of area.	Fracture.	Elongation of inch sections.
					Total.	Per square inch.						
			In.	*Sq. in.*	*Pounds.*	*Pounds.*	*In.*	*P. ct.*	*In.* *Sq. in.*	*P. ct.*		" " " " " " " " " "
9396	Plain bar ...	.161	1.27	1.27	72,680	57,230	2.96	29.6	Diam. .80 = .50	60.6	Silky	.22, .28, .73*, .43, .27, .23, .22, .21, .18, .19
9397	Scarf weld..	.161	1.28	1.29	71,500	55,430	1.40	14.0	Diam. 1.17 = 1.07	17.1	Followed scarf weld. Length of scarf 2".43.	.17, .13, .10, .12, .24*, .16, .12, .12, .12, .12
9398	.....do	.161	1.29	1.31	73,420	56,050	1.29	12.9	Diam. 1.21 = 1.15	12.2	Followed scarf weld. Length of scarf 3".30.	.11, .09, .10, .20*; .17, .15, .12, .10, .13, .12
9399	Plain bar ...	.172	1.26	1.25	82,300	65,840	3.06	30.6	Diam. .87 = .59	52.8	Silky	.24, .27, .44, .67*, .33, .26, .25, .22, .20, .18
9400	Scarf weld..	.172	1.28	1.29	69,900	54,190	.80	8.0	Diam. 1.22 = 1.17	9.3	Followed scarf weld. Length of scarf 3".20.	.06, .05, .05, .32*, .06, .05, .05, .06, .05, .05
9401	.....do	.172	1.29	1.31	82,350	62,860	1.61	16.1	Diam. .89 = .62	52.7	Silky. Fractured outside the weld.	.16, .12, .13, .13, .13, .13, .11, .13, .16, .41
9402	Plain bar ...	.341	1.26	1.25	101,980	81,580	2.33	23.3	Diam. .91 = .65	48.0	Silky	.22, .33, .55*, .25, .21, .17, .17, .15, .14, .14
9403	Scarf weld..	.341	1.28	1.29	102,400	79,380	1.16	11.6	Diam. .88 = .61	52.7	Silky. Fractured outside the weld.	.14, .10, .11, .10, .10, .11, .11, .11, .12, .16
9404	.....do	.341	1.27	1.27	98,700	77,710	1.60	16.0	Diam. .94 = .69	45.7	Silky, trace of granulation. Fractured outside the weld.	.47*, .22, .10, .10, .10, .10, .10, .09, .13, .19

STEEL BARS FOR CHAIN CABLE, FOR BUREAU OF EQUIPMENT, BOSTON NAVY-YARD.



No. of test.	Dimensions in inches. (Diameter.)	Sectional area.	Elastic limit.		Ultimate strength.		Elongation in 8 inches.		Area at fracture.	Contraction of area.	Appearance of fracture.	Elongation of inch sections.
			Total.	Per square inch.	Total.	Per square inch.						
		Sq. inch.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Inches.*	*Per ct.*	*Sq. in.*	*Per cent.*		″ ″ ″ ″ ″ ″ ″ ″
9335	2.53	5.027	168,500	33,520	250,500	49,830	2.67	33.4	Diam. 1.82 = 2.601	48.3	Silky, oblique	.15, .15, .18, .32, .67*, .62*, .32, .26
9336	2.50	4.909	181,100	36,890	275,400	56,100	2.54	31.8	Diam. 1.85 = 2.688	45.2	Silky, oblique: small spots of lighter colored metal near the center.	.36, .72*, .39, .27, .22, .20, .20, .18

COLD ROLLED STEEL.



Number of test.	Mark on specimen.	Dimensions in inches. (Diameter.)	Sectional area.	Ultimate strength.		Elongation in 8 inches.		Area at fracture.	Contraction of area.	Appearance at fracture.	Elongation of inch section.
				Total.	Per square inch.						
			Sq. in.	*Pounds.*	*Pounds.*	*Inches.*	*P. ct.*	*In.* *Sq. in.*	*Per cent.*		" " '
9325	2	".874	.600	49,240	82,070	.71	23.7	Diam. .59 = .273	54.5	Fine silky; cup shaped	.26*, .34*, .11
9326	5	".874	.600	48,870	81,450	.59	19.7	Diam. .61 = .292	51.3	.....do.	.42*, .08, .09
9327	8	".874	.600	48,990	81,650	.62	20.7	Diam. .59 = .273	54.5	.....do.	.44*, .09, .09

STEEL FOR STANDARDIZING TESTING MACHINE AT THE NILES TOOL WORKS COMPANY.

SPECIMENS S L_2, S L_4, S L_6, AND S L_7 FORGED STEEL NO. 1, ANNEALED.

No. 5734.

Marks, S L_2.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000300	.000200	....	....	
3,000	15,000	.000450	.000150	....	....	
4,000	20,000	.000600	.000150	....	....	
5,000	25,000	.000800	.000200	....	....	
6,000	30,000	.000950	.000150	0.	....	
6,800	34,000	....	....	....	....	Elastic limit, approximate.
						Load fell.
6,200	31,000	.011250	.010300	....	....	
6,400	32,000	.022000	.010750	....	....	
6,600	33,000	.025750	.003750	....	....	
6,800	34,000	.026500	.000750	....	....	
7,000	35,000	.029000	.002500	....	....	
8,000	40,000	.045250	.006250	....	....	
9,000	45,000	.069250	.024000	....	....	
10,000	50,000	.118500	.049250	....	....	
10,450	52,250	.2500	.1315	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	52,250
Elastic limit per square inch of original section (approximate)	do...	34,000
Elongation per inch after rupture	inch..	.4200
Reduction in diameter at point of rupture	do...	.205
Reduction in area after rupture, per cent of original section		64.6
Position of rupture		1.″25 from neck
Character of broken surface		fine silky
Elongation of inch sections		″.54*, ″.30

No. 5735.

Marks, S L_4.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000250	.000150	....	....	
3,000	15,000	.000450	.000200	....	....	
4,000	20,000	.000600	.000150	....	....	
5,000	25,000	.000750	.000150	....	....	
6,000	30,000	.000950	.000200	0.	....	
7,000	35,000	.001150	.000200	....	....	Elastic limit.
						Load fell.
6,000	30,000	.004250	.003100	....	....	
6,200	31,000	.005600	.001350	....	....	
6,400	32,000	.007500	.001900	....	....	
6,600	33,000	.018000	.010500	....	....	
6,800	34,000	.028500	.010500	....	....	
7,000	35,000	.030000	.001500	....	....	
8,000	40,000	.048000	.018000	....	....	
9,000	45,000	.072250	.024250	....	....	
10,000	50,000	.122150	.049900	....	....	
10,510	52,550	.2650	.142850	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	52,550
Elastic limit per square inch of original section	do...	35,000
Elongation per inch after rupture	inch..	.4000
Elongation per inch under strain at elastic limit	do...	.001150
Reduction in diameter at point of rupture	do...	.205
Reduction in area after rupture, per cent of original section		64.6
Position of rupture		″.95 from neck
Character of broken surface		fine silky
Elongation of inch sections		″.55*, ″.25

No. 5736.

Marks, S L$_6$.
Diameter, ''.505.
Sectional area, .20 square inch.
Gauged length, 2''.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000250	.000150	....	....	
3,000	15,000	.000400	.000150	....	....	
4,000	20,000	.000600	.000200	....	....	
5,000	25,000	.000750	.000150	....	....	
6,000	30,000	.000900	.000150	....	....	Elastic limit.
						Load fell.
5,000	25,000	.002000	.001100	....	....	
5,200	26,000	.002300	.000300	....	....	
5,400	27,000	.002900	.000600	....	....	
5,600	28,000	.005250	.002350	....	....	
5,800	29,000	.011000	.005750	....	....	
6,000	30,000	.015000	.004000	....	....	
7,000	35,000	.032000	.017000	....	....	
8,000	40,000	.048250	.016250	....	....	
9,000	45,000	.071750	.023500	....	....	
10,000	50,000	.139500	.067750	....	....	
10,240	51,200	.2200	.0805	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section ....pounds..	51,200
Elastic limit per square inch of original section............do...	30,000
Elongation per inch after rupture............inch..	.3750
Elongation per inch under strain at elastic limit............do...	.000900
Reduction in diameter at point of rupture ....do...	.215
Reduction in area after rupture, per cent of original section	66.9
Position of rupture............	1'' from neck
Character of broken surface	fine silky
Elongation of inch sections	''.52*, ''.23

No. 5740.

Mark, S L$_7$.
Diameter, ''.505.
Sectional area, .20 square inch.
Gauged length, 2''.
NOTE.—Stem of specimen is not straight.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.	....	
2,000	10,000	.000350	.000200	....	....	
3,000	15,000	.000500	.000150	....	....	
4,000	20,000	.000650	.000150	....	....	
5.000	25,000	.000850	.000200	....	....	
5,800	29,000	....	....	....	....	Elastic limit, approximate.
6,000	30,000 {	.001200	.000350	....	....	
		.003650	.002450	.002650	.002650	

SPECIMENS H L_2, H L_4, H L_6, AND H L_7, FORGED STEEL No. 3, ANNEALED.

No. 5737.

Marks, H L_2.
Diameter, ″.505.
Sectional area, .25 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	0.		
2,000	10,000	.000400	.000250			
3,000	15,000	.000550	.000150			
4,000	20,000	.000750	.000200			
5,000	25,000	.000900	.000150			
6,000	30,000	.001050	.000150			
7,000	35,000	.001250	.000200			
8,000	40,000	.001450	.000200			
9,000	45,000	.001600	.000150			
10,000	50,000	.001750	.000150	.000100	.000100	
11,000	55,000	.001950	.000200			
11,200	56,000	.002000	.000050			
11,400	57,000	.002050	.000050			Elastic limit.
		.008700	.006650			
11,600	58,000	.009200	.000500			
11,800	59,000	.009600	.000400			
12,000	60,000	.010800	.001200			
13,000	65,000	.015050	.004250			
14,000	70,000	.019150	.004100			
15,000	75,000	.023750	.004600			
16,000	80,000	.029450	.005700			
17,000	85,000	.035900	.006450			
18,000	90,000	.043650	.007750			
19,000	95,000	.054500	.010850			
20,000	100,000	.075000	.020500			
20,710	108,550	.1350	.0600			Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	103,550
Elastic limit per square inch of original section	do...	57,000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.002050
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per cent of original section		30.7
Position of rupture		″.85 from neck
Character of broken surface		fine granular; silky center
Elongation of inch sections		″.14, ″.26*

No. 5738.

Marks, H L_1.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1, 000	0.	0.	0.	0.	Initial load.
1, 000	5, 000	.000150	.000150	0.	....	
2, 000	10, 000	.000300	.000150	....	....	
3, 000	15, 000	.000450	.000150	....	....	
4, 000	20, 000	.000650	.000200	....	....	
5, 000	25, 000	.000850	.000200	....	....	
6, 000	30, 000	.001000	.000150	0.	....	
7, 000	85, 000	.001150	.000150	....	....	
8, 000	40, 000	.001350	.000200	.000050	.000050	
9, 000	45, 000	.001500	.000150	....	....	
10, 000	50, 000	.001700	.000200	....	....	
11, 000	55, 000	.001900 .007250	.000200 .005350	....	....	Elastic limit.
11, 200	56, 000	.007650	.000400	....	....	
11, 400	57, 000	.008600	.000950	....	....	
11, 600	58, 000	.009000	.000400	....	....	
11, 800	59, 000	.010000	.001000	....	....	
12, 000	60, 000	.010600	.000600	....	....	
13, 000	65, 000	.014800	.004200	....	....	
14, 000	70, 000	.019200	.004400	....	....	
15, 000	75, 000	.023800	.004600	....	....	
16, 000	80, 000	.029600	.005800	....	....	
17, 000	85, 000	.035900	.006300	....	....	
18, 000	90, 000	.044850	.008950	....	....	
19, 000	95, 000	.056100	.011250	....	....	
20, 000	100, 000	.078500	.022400	....	....	
20, 690	103, 450	.1400	.0615	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds	103, 450
Elastic limit per square inch of original section	do	55, 000
Elongation per inch after rupture	inch	.1900
Elongation per inch under strain at elastic limit	do	.001900
Reduction in diameter at point of rupture	do	.085
Reduction in area after rupture, per cent of original section		30. 7
Position of rupture		″.7 from neck
Character of broken surface		fine granular, silky center
Elongation of inch sections		″.25*, ″.13

No. 5739.

Marks, H L_6.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000250	.000150	....	....	
3,000	15,000	.000450	.000200	....	....	
4,000	20,000	.000600	.000150	....	....	
5,000	25,000	.000750	.000150	....	....	
6,000	30,000	.000950	.000200	....	....	
7,000	35,000	.001100	.000150	....	....	
8,000	40,000	.001300	.000200	0.	....	
9,000	45,000	.001500	.000200	....	....	
10,000	50,000	.001650	.000150	....	....	
11,000	55,000	.001850	.000200	....	....	
11,200	56,000	.001900 .005900	.000050 .004000	....	....	Elastic limit.
11,400	57,000	.009500	.003600	....	....	
11,600	58,000	.010000	.000500	....	....	
11,800	59,000	.010850	.000850	....	....	
12,000	60,000	.011500	.000650	....	....	
13,000	65,000	.015750	.004250	....	....	
14,000	70,000	.020500	.004750	....	....	
15,000	75,000	.025250	.004750	....	....	
16,000	80,000	.031100	.005850	....	....	
17,000	85,600	.038000	.006900	....	....	
18,000	90,000	.048000	.010000	....	....	
19,000	95,000	.061000	.013000	....	....	
20,000	100,000	.0950	.0340	....	....	
20,390	101,950	.1350	.0400	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	101,950
Elastic limit per square inch of original section	do...	56,000
Elongation per inch after rupture	inch..	.2000
Elongation per inch under strain at elastic limit	do...	.001900
Reduction in diameter at point of rupture	do...	.085
Reduction in area after rupture, per cent of original section		30.7
Position of rupture		″.9 from neck
Character of broken surface		fine granular, silky center
Elongation of inch sections		″.25*, ″.15

No. 5741.

Marks, H L.
Diameter, ″.505.
Section area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1.000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000250	.000150	....	....	
3,000	15,000	.000400	.000150	....	....	
4,000	20,000	.000600	.000200	....	....	
5,000	25,000	.000800	.000200	....	....	
6,000	30,000	.000950	.000150	....	....	
7,000	35,000	.001100	.000150	....	....	
8,000	40,000	.001300	.000200	0.	....	
9,000	45,000	.001450	.000150	....	....	
10,000	50,000	.001600	.000150	....	....	
11,000	55,000	.001800	.000200	....	....	Elastic limit.
11,200	56,000	.001900	.000100	....	....	
		.008600	.006700	....	....	

NICKEL STEEL.

No. 5940.

Marks, 8 N I and R H I

Diameter, ″.505.

Sectional area, .20 square inch.

Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000100	.000100	0.	....	
2,000	10,000	.000350	.000250	....	....	
4,000	20,000	.000650	.000300	....	....	
6,000	30,000	.001050	.000400	....	....	
7,000	35,000	.001250	.000200	....	....	
8,000	40,000	.001500	.000250	0.	....	
9,000	45,000	.001700	.000200	....	....	
10,000	50,000	.001950	.000250	.000050	.000050	
11,000	55,000	.002150	.000200	....	....	Elastic limit, approximate.
12,000	60,000	.002550	.000400	.000400	.000350	
12,200	61,000	.002650	.000100	....	....	
12,400	62,000	.002750	.000100	....	....	
12,600	63,000	.002950	.000200	....	....	
12,800	64,000	.003050	.000100	....	....	
13,000	65,000	.003250	.000200	.000800	.000400	
13,200	66,000	.003500	.000250	....	....	
13,400	67,000	.003600	.000100	....	....	
13,600	68,000	.003900	.000300	....	....	
13,800	69,000	.004100	.000200	....	....	
14,000	70,000	.004550	.000450	.001900	.001100	
14,200	71,000	.005000	.000450	....	....	
14,400	72,000	.005250	.000250	....	....	
14,600	73,000	.005600	.000350	....	....	
14,800	74,000	.006400	.000800	....	....	
15,000	75.000	.007750	.001350	....	....	
15,200	76,000	.008650	.000900	....	....	
15,600	78,000	.011750	.003100	....	....	
16,000	80,000	.014500	.002750	....	....	
16,400	82,000	.018000	.003500	....	....	
16,800	84,000	.021750	.003750	....	....	
17,200	86,000	.025750	.004000	....	....	
17,600	88,000	.020000	.004250	....	....	
18,000	90,000	.039650	.010650	....	....	
18,400	92,000	.041250	.001600	....	....	
18,800	94,000	.043150	.001900	....	....	
19,200	96,000	.056000	.012850	....	....	
19,600	98,000	.058250	.002250	....	....	
20,000	100,000	.064500	.006250	....	....	
20,400	102,000	.073500	.009000	....	....	
20,800	104,000	.088000	.014500	....	....	
21,200	106,000	.097000	.009000	....	....	
21,600	108,000	.120500	.023500	....	....	
22,000	110,000	.1400	.0195	....	....	
22,270	111,350	.2100	.0700	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section	pounds..	111,350
Elastic limit per square inch of original section (approximate)	do...	55,000
Elongation per inch after rupture	inch..	.3100
Elongation per inch under strain at elastic limit	do...	.002150
Reduction in diameter at point of rupture	do...	.175
Reduction in area after rupture, per cent of original section		57.2
Position of rupture		at middle of the stem
Character of broken surface		fine silky
Elongation of inch sections		″.33*, ″.29*

No. 5941.

Marks, 19.
Diameter, ″.505.
Sectional area, .20 square inch.
Gauged length, 2″.

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
200	1,000	0.	0.	0.	0.	Initial load.
1,000	5,000	.000150	.000150	....	....	
2,000	10,000	.000300	.000150	....	....	
4,000	20,000	.000650	.000350	....	....	
6,000	30,000	.001000	.000350	....	....	
8,000	40,000	.001550	.000550	.000150	.000150	Elastic limit, approximate.
8,200	41,000	.001650	.000100	....	....	
8,400	42,000	.001800	.000150	....	....	
8,600	43,000	.001850	.000050	....	....	
8,800	44,000	.001950	.000100	....	....	
9,000	45.000	.002000	.000050	.000350	.000200	
9,200	46,000	.002050	.000050	....	....	
9,400	47,000	.002150	.000100	....	....	
9,600	48,000	.002300	.000150	....	....	
9,800	49,000	.002350	.000050	....	....	
10.000	50,000	.002400	.000050	.000450	.000100	
10,200	51,000	.002400	0.	....	....	
10,400	52,000	.002450	.000050	....	....	
10,600	53,000	.002550	.000100	....	....	
10,800	54,000	.002700	.000150	....	....	
11,000	55,000	.002850	.000150	.000700	.000250	
11,200	56,000	.002960	.000050	....	....	
11,400	57,000	.002950	.000050	....	....	
11,600	58.000	.003000	.000050	....	....	
11,800	59,000	.003200	.000200	....	....	
12,000	60,000	.003300	.000100	.000950	.000250	
12,200	61,000	.003450	.000150	....	....	
12,400	62,000	.003500	.000050	....	....	
12,600	63,000	.003650	.000150	....	....	
12,800	64,000	.003850	.000200	....	....	
13,000	65,000	.003900	.000050	.001450	.000500	
13.200	66.000	.004150	.000250	....	....	
13.400	67.000	.004350	.000200	....	....	
13,600	68,000	.004450	.000100	....	....	
13,800	69,000	.004550	.000100	....	....	
14,000	70,000	.004850	.000300	.002050	.000600	
14,200	71,000	.005000	.000150	....	....	
14,400	72,000	.005250	.000250	....	....	
14.600	73,000	.005400	.000150	....	....	
14,800	74,000	.005650	.000250	....	....	
15,000	75,000	.005950	.000300	.003000	.000950	
15,200	76,000	.006350	.000400	....	....	
15,400	77,000	.006500	.000150	....	....	
15,600	78,000	.006850	.000350	....	....	
15,800	79,000	.007250	.000400	....	....	
16,000	80,000	.007650	.000400	.004500	.001500	
16.200	81.000	.008050	.000400	....	....	
16,400	82,000	.008450	.000400	....	....	
16,600	83,000	.008850	.000400	....	....	
16,800	84,000	.009400	.000550	....	....	
17,000	85,000	.010450	.001050	.007000	.002500	
17,200	86,000	.011150	.000700	....	....	
17,400	87,000	.011500	.000350	....	....	
17,600	88.000	.012150	.000650	....	....	
17,800	89.000	.013150	.001000	....	....	
18,000	90 000	.014950	.001800	.011300	.001300	
18,400	92,000	.017050	.002100	....	....	
18,800	94,000	.019500	.002450	....	....	
19,200	96,000	.024000	.004500	....	....	
19.600	98,000	.028000	.004000	....	....	
20,000	100,000	.033250	.005250	.028700	.017400	
200	1,000	....	....	....	....	Rested under this load five minutes.
20,400	102,000	.036000	.002750	....	....	
20,800	104.000	.046750	.010750	....	....	
21,200	106.000	.063000	.016250	....	....	
21,590	107,950	....	....	....	....	Tensile strength.

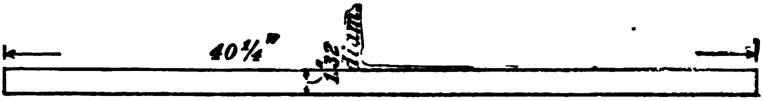
General summary.

Tensile strength per square inch of original section	pounds..	107,950
Elastic limit per square inch of original section (approximate)	do...	40,000
Elongation per inch after rupture	inch..	.2150
Elongation per inch under strain at elastic limit	do...	.001550
Reduction in diameter at point of rupture	do...	.175
Reduction in area after rupture, per cent of original section		57.2
Position of rupture		″.70 from neck
Character of broken surface		fine silky
Elongation of inch sections		″.34*, ″.09

Remarks.—Nickel-steel specimens Nos. 5940 and 5941 did not have sharply defined elastic limits. Sets were gradually developed, the ratio of stress to strain showing no abrupt change as the tests progressed.

TENSION TEST OF WROUGHT IRON BAR (BURDENS).

From Arsenal smith shop.
No. 9348.



ROUGH BAR.

Sectional area, 1.37 square inches.
Elastic limit, 48,200 pounds = 35,190 pounds per square inch.
Tensile strength, 72,140 pounds = 52,660 pounds per square inch.
Elongation in 10 inches, 2″.02 = 20.2 per cent.
Elongation of inch sections, ″.20, ″.15, ″.17, ″.14, ″.48*, ″.24, ″.16, ″16, ″.17, ′.15.
Diameter at fracture, 1″.15 area, 1.04 square inches.
Contraction of area, 24.1 per cent.
Appearance of fracture, fibrous, seamy.

CAST IRON FOR IMPACT MACHINE.

Specimen turned down from runner.

No. 5864.

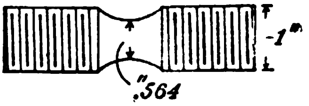
Diameter, 3''.21.
Sectional area, 8''.093.
Length of stem, 12''
Gauged length, 10''

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Povnds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
8, 093	1, 000	0.	0.	0.	0.	Initial load.
16, 186	2, 000	.00004	.00004	....	....	
24, 279	3, 000	.00008	.00004	....	....	
32, 372	4, 000	.00011	.00003	....	....	
40, 465	5, 000	.00015	.00004	—. 00004	—. 00004	
48. 558	6, 000	.00020	.00005	....	....	
56, 651	7, 000	.00025	.00005	....	....	
64, 744	8, 000	.00032	.00007	....	....	
72, 837	9, 000	.00041	.00009	....	....	
80, 930	10, 000	.00050	.00009	—. 00001	.00003	
89, 023	11, 000	.00059	.00009	....	....	
97, 116	12, 000	.00069	.00010	....	....	
105, 209	13, 000	.00082	.00013	....	....	
113, 302	14, 000	.00094	.00012	....	....	
121. 395	15, 000	.00106	.00012	....	....	
129, 488	16, 000	.00119	.00013	....	....	
179, 700	22, 200	....	....	....	....	Tensile strength.

Fractured at the neck. Appearance, fine granular, interspersed with coarser granular spots. Light gray.

CAST IRON.

MICROSCOPE CARRIAGE OF STANDARD COMPARATOR.



No of test.	Description.	Diameter.	Sectional area.	Tensile strength.		Appearance of fracture.
				Total.	Per square inch.	
		Inches.	*Sq.inch.*	*Pounds.*	*Pounds.*	
9362	From casting.........	.564	.25	7, 290	29. 160	Fine granular, light gray.
9363	Same after annealing.	.564	.25	6, 320	25. 280	Fine granular, dark gray.

CHEMICAL COMPOSITION.

No. of test.	Carbon.			Manganese	Silicon.	Sulphur.	Phosphorus.
	Total.	Graphitic.	Combined				
9362	2. 901	1. 835	1. 066	0. 303	1. 600	0. 090	0. 640
9363	3. 206	2. 721	0. 485	0. 350	1. 665	0. 097	0. 630

CAST IRON FURNISHED BY PRIVATE PARTIES FOR ORDNANCE MATERIAL.

No. of test.	Description.	Marks.	Tensile strength per square inch.	Fracture.	Specific gravity.
			Pounds.		
5488	Racer for gun carriage.	R 41 I T I X	33, 410	Fine granular, dark gray	....
5609	Base ring for gun carriage.	B R 91 2	29, 920	Fine granular, gray	....
5592	10-inch all round fire disappearing carriage.	1	29, 980	Granular, dark gray	....
5593	.....do	3	29, 470	.....do	....
5594	.....do	5	29, 410	.....do	....
5600	.....do	2	28, 520	Fine granular, gray	....
5601	.....do	3	27, 980	.....do	....
5611	10-inch limited fire disappearing carriage.	4	27, 520	.....do	....
5612	.....do	5	27, 980	.....do	....
5618	.....do	6	28. 390	.....do	7. 2039
5623	.....do	7	28, 980	.....do	....
5631	.....do	8	31, 300	.....do	....
5651	.....do	9	29. 040	Granular, gray	....
5652	.....do	10	32, 020	.....do	....
5657	.....do	11	31, 700	Fine granular, light gray	....
5661	.....do	12	29, 880	Granular, gray	....
5687	.....do	13	31, 350	Fine granular, light gray	....
5688	.....do	14	31, 600	.....do	....
5689	.....do	15	29, 540	.....do	....
5473	.....do	1–1	28, 910	Granular, mottled, granitic	....
5474	.....do	2–2	28, 920	.....do	....
5475	.....do	3–3	28, 790	.....do	....
5476	.....do	5–5	20, 100	.....do	....
5477	.....do	7–7	29, 470	.....do	....
5478	.....do	8–8	28, 360	.....do	....
5603	.....do	1	23, 400	Fine granular, gray	....
5604	.....do	2	24. 480	.....do	....
5614	3.2-inch shell	1	22, 510	Medium coarse granular, gray.	7. 1760
5615	.....do	3	22, 360	.....do	7. 1335
5616	.....do	5	22, 930	.....do	7. 0980
5619	.....do	11	24, 240	Medium granular, gray	....
5620	.....do	F 7 A	22, 700	Fine granular, gray	....
5621	.....do	S 8 A	23, 620	.....do	....
5629	.....do	13 A	21, 700	Granular, gray	....
5630	.....do	14	25, 600	.....do	....
5632	.....do	16	23, 700	Granular, gray	....
5633	.....do	17	22. 780	.....do	....
5634	.....do	18 S	24, 650	.....do	....
5637	.....do	....	25. 180	Medium granular, gray	....
5660	.....do	L_1	26. 310	Granular, gray	....
5062	.....do	L_2	33, 600	Fine granular, gray	....
5675	.....do	• • •	33, 280	Fine granular, light gray	....
5676	.....do	• • • •	31, 500	Fine granular, gray	....
5677	.....do	• • • • •	28, 300	.....do	....
5678	.....do	6	30, 200	.....do	....
5685	.....do	7	32, 080	Fine granular, light gray.	....
5644	10-inch shot.	11	29. 380	Granular, mottled	....
5645	.....do	15	30, 990	.....do	....
5686	Axle box	....	20, 720	Granular, dark gray	....
5635	From Watervliet Arsenal.	W 4	22, 180	Fine granular, gray	....
5636	.....do	W 5	18, 210	Medium granular, dark gray.	....
5554	Vertical impact testing machine.	Anvil No. 4.	27, 980	Fine granular, gray	7. 0999
5555	.....do	Anvil No. 5.	28, 230	.....do	7. 1297
5509	.....do	Anvil No. 5.	27, 350	.....do	....
5616	.....do	Anvil No. 5.	25, 500	Fine and medium granulation interspersed, gray.	....
5571	.....do	Anvil No. 5.	28, 990	Fine granular, gray	....
5568	.....do	....	22, 360	Medium and fine granulation.	....
5569	.....do	....	23, 720	Fine granular, gray	....
5570	.....do	....	19, 580	Medium and fine granulation.	....
5573	.....do	....	26, 540	Fine granular, light gray, mottled.	....

CONSOLE BRONZE.

No. 5810.

Marks, 23.
Diameter, ".564.
Sectional area, .25 square inch.
Length of stem, 10".
Gauged length 10".

Applied loads.		Elongation per inch.	Successive elongation per inch.	Permanent set.	Successive permanent set.	Remarks.
Total.	Per square inch.					
Pounds.	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	
250	1,000	0.	0.	0.	0.	Initial load.
500	2,000	.000100	.000100	....	....	
750	3,000	.000233	.000133	....	....	
1,000	4,000	.000400	.000167	....	....	
1,250	5,000	.000533	.000133	.000133	.000133	
1,500	6,000	.000667	.000134	....	....	
1,750	7,000	.000767	.000100	....	....	
2,000	8,000	.000900	.000133	....	....	
2,250	9,000	.001033	.000133	....	....	
2,500	10,000	.001267	.000234	.000467	.000334	
2,750	11,000	.001433	.000166	....	....	
3,000	12,000	.001700	.000267	....	....	
3,250	13,000	.002000	.000300	....	....	
3,500	14,000	.002500	.000500	....	....	
3,750	15,000	.002933	.000433	.001567	.001100	
4,000	16,000	.003533	.000600	....	....	
4,250	17,000	.004133	.000600	....	....	
4,500	18,000	.005067	.000934	....	....	
4,750	19,000	.005933	.000866	....	....	
5,000	20,000	.007433	.001500	.005333	.003766	
5,250	21,000	.008800	.001367	....	....	
5,500	22,000	.011033	.002233	....	....	
5,750	23,000	.013267	.002234	....	....	
6,000	34,000	.016600	.003333	....	....	
6,250	25,000	.018933	.002333	.016033	.010700	
6,500	26,000	.023167	.004234	....	....	
6,750	27,000	.026100	.002933	....	....	
7,000	28,000	.030900	.004800	....	....	
7,250	29,000	.034600	.003700	....	....	
7,500	30,000	.040067	.005467	.036467	.020434	
8,000	32,000	.0533	.013233	....	....	
8,500	34,000	.0633	.0100	....	....	
9,000	36,000	.0767	.0134	....	....	
9,500	38,000	.0900	.0133	....	....	
10,000	40,000	.1067	.0167	....	....	
10,500	42,000	.1233	.0166	....	....	
11,000	44,000	.1467	.0234	....	....	
11,500	46,000	.1700	.0233	....	....	
12,000	48,000	.1967	.0267	....	....	
12,500	50,000	.2333	.0366	....	....	
12,980	51,920	....	....	....	....	Tensile strength.

General summary.

Tensile strength per square inch of original section..........pounds..	51,920
Elongation per inch after rupture..........inch..	.2900
Reduction in diameter at point of rupture..........do...	.104
Reduction in area after rupture, per cent of original section..........	33.5
Position of rupture..........	".7 from neck
Character of broken surface..........	uniform light yellow color
Elongation of inch sections..........	".34*, ".26, ".27

COPPER CYLINDERS FOR PRESSURE GAUGES.

COPPER CYLINDERS FOR PRESSURE GAUGES.

Mean compression of 10 copper cylinders from lot of 100 received from Frankford Arsenal, November 24, 1897. Metal of September 1896.

Table for use with crusher gauge one-tenth square inch area.

Mean dimensions of cylinders: Length, ″.4994; diameter, ″.2516.

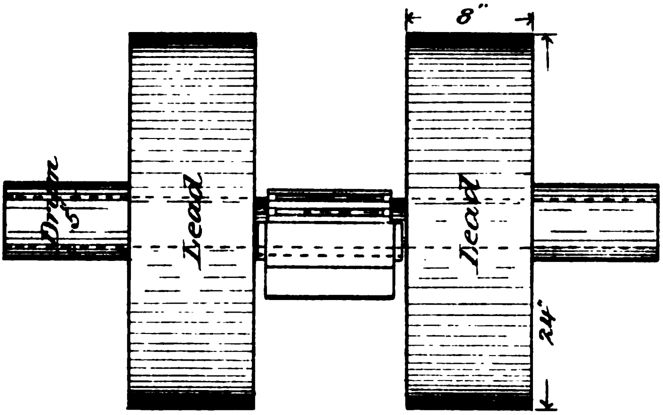
Load per square inch on crusher gauge $\frac{1}{10}$ square inch area.	Total compression.											Mean corrected sets.
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	Mean.	
Pounds.	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
3,000	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
6,000	.0025	.0022	.0013	.0017	.0027	.0020	.0026	.0034	.0025	.0023	.0023	.0021
9,000	.0131	.0124	.0111	.0123	.0132	.0120	.0132	.0133	.0123	.0129	.0126	.0121
10,000	.0159	.0165	.0160	.0163	.0169	.0165	.0169	.0175	.0161	.0158	.0164	.0158
11,000	.0202	.0205	.0186	.0200	.0208	.0189	.0210	.0208	.0193	.0201	.0200	.0194
12,000	.0242	.0249	.0224	.0240	.0244	.0232	.0247	.0255	.0237	.0247	.0242	.0235
13,000	.0281	.0281	.0262	.0279	.0289	.0270	.0285	.0286	.0278	.0276	.0280	.0272
14,000	.0323	.0325	.0308	.0321	.0332	.0315	.0330	.0334	0318	.0322	.0323	.0314
15,000	.0364	.0366	.0345	.0371	.0373	.0355	.0374	.0376	.0360	.0361	.0364	.0354
16,000	.0451	.0416	.0388	.0414	.0420	.0397	.0419	.0424	.0402	.0105	.0414	.0403
17,000	.0458	.0461	.0436	.0455	.0466	.0442	.0462	.0467	.0457	.0450	.0455	.0444
18,000	.0501	.0501	.0480	.0500	.0511	.0489	.0507	.0516	.0194	.0498	.0500	.0489
19,000	.0545	.0548	.0528	.0548	.0547	.0530	.0555	.0565	.0535	.0537	.0544	.0533
20,000	.0589	.0594	.0669	.0595	.0609	.0579	.0605	.0609	.0590	.0583	.0592	.0581
21,000	.0639	.0637	.0617	.0639	.0645	.0624	.0654	.0651	.0625	.0630	.0636	.0625
22,000	.0688	.0685	.0659	.0690	.0690	.0675	.0694	.0700	.0681	.0677	.0684	.0673
23,000	.0732	.0734	.0714	.0731	.0734	.0720	.0744	.0745	.0722	.0731	.0731	.0720
24,000	,0775	.0782	.0755	.0780	.0789	.0765	.0783	.0790	.0773	.0774	.0777	.0765
25,000	.0830	.0832	.0801	.0835	.0830	.0815	.0839	.0846	.0821	.0820	.0827	.0815
26,000	.0877	.0876	.0850	.0882	.0880	.0870	.0885	.0901	.0864	.0870	.0875	.0863
27,000	.0928	.0929	.0890	.0933	.0934	.0908	.0940	.0942	.0918	.0923	.0924	.0912
28,000	.0977	.0978	.0944	.0973	.0985	.0967	.0989	.0991	.0961	.0976	.0974	.0962
29,000	.1030	.1031	.0989	.1031	.1039	.1025	.1048	.1045	.1016	.1025	.1028	.1016
30,000	.1081	.1079	.1044	.1081	.1083	.1078	.1085	.1085	.1061	.1076	.1075	.1062
31,000	.1132	.1132	.1090	.1127	.1125	.1120	.1136	.1142	.1118	.1134	.1126	.1113
32,000	.1180	.1185	.1151	.1180	.1181	.1174	.1190	.1194	.1162	.1179	.1178	.1165
33,000	.1234	.1242	.1205	.1238	.1249	.1220	.1232	.1250	.1215	.1234	.1232	.1219
34,000	.1288	.1288	.1258	.1284	.1269	.1282	.1289	.1298	.1279	.1280	.1284	.1271
35,000	.1337	.1315	.1310	.1333	.1330	.1327	.1340	.1350	.1313	.1335	.1331	.1317
36,000	.1385	.1387	.1357	.1390	.1383	.1376	.1394	.1395	.1365	.1385	.1382	.1368
37,000	.1439	.1441	.1400	.1445	.1443	.1420	.1435	.1449	.1415	.1433	.1432	.1418
38,000	.1484	.1486	.1454	.1493	.1488	.1482	.1486	.1500	.1459	.1470	.1481	.1467
39,000	.1537	.1540	.1504	.1543	.1548	.1531	.1542	.1550	.1496	.1530	.1532	.1518
40,000	.1586	.1585	.1552	.1587	.1590	.1586	.1594	.1590	.1550	.1574	.1580	.1566
41,000	.1634	.1639	.1597	.1632	.1636	.1626	.1635	.1650	.1595	.1625	.1627	.1613
42,000	.1682	.1681	.1644	.1687	.1689	.1676	.1677	.1698	.1645	.1670	.1676	.1662
43,000	.1730	.1732	.1698	.1740	.1743	.1724	.1721	.1749	.1684	.1729	.1725	.1711
44,000	.1778	.1777	.1737	.1784	.1789	.1770	.1772	.1794	.1735	.1771	.1771	.1757
45,000	.1828	.1824	.1788	.1834	.1848	.1815	.1824	.1851	.1776	.1820	.1821	.1807
46,000	.1863	.1870	.1838	.1881	.1877	.1862	.1855	.1886	.1825	.1865	.1862	.1848
47,000	.1920	.1920	.1877	.1926	.1930	.1911	.1891	.1931	.1864	.1913	.1008	.1894
48,000	.1953	.1957	.1928	.1965	.1975	.1955	.1958	.1977	.1914	.1957	.1954	.1940
49,000	.1990	.1995	.1967	.2004	.2030	.1977	.1998	.2019	.1955	.2005	.1094	.1980
50,000	.2031	.2036	.2010	.2045	.2060	.2027	.2045	.2062	.2003	.2039	.2036	.2022
51,000	.2070	.2074	.2051	.2079	.2100	.2065	.2075	.2099	.2035	.2075	.2072	.2058
52,000	.2112	.2118	.2083	.2120	.2144	.2107	.2124	.2140	.2077	.2111	.2114	.2100
53,000	.2154	.2154	.2117	.2166	.2180	.2145	.2155	.2179	.2115	.2158	.2152	.2138
54,000	.2190	.2189	.2163	.2200	.2214	.2188	.2194	.2220	.2152	.2190	.2190	.2176
55,000	.2231	.2224	.2195	.2235	.2257	.2220	.2229	.2255	.2190	.2230	.2227	.2213
56,000	.2269	.2260	.2235	.2271	.2285	.2258	.2260	.2286	.2225	.2269	.2262	.2249
57,000	.2297	.2298	.2264	.2300	.2334	.2291	.2296	.2325	.2259	.2300	.2296	.2283
58,000	.2332	.2330	.2295	.2338	.2360	.2330	.2329	.2356	.2290	.2335	2329	.2316
59,000	.2366	.2361	.2339	.2360	.2388	.2358	.2363	.2381	.2329	.2369	.2362	.2349
60,000	.2395	.2390	.2365	.2398	.2424	.2390	.2390	.2422	.2362	.2400	.2394	.2381
61,000	.2433	.2425	.2394	.2429	.2453	.2423	.2428	.2446	.2389	.2430	.2425	.2412
62,000	.2460	.2455	.2423	.2459	.2478	.2447	.2454	.2475	.2424	.2463	.2454	.2441
63,000	.2487	.2481	.2449	.2485	.2510	.2479	.2475	.2502	.2451	.2493	.2481	.2468
64,000	.2518	.2512	.2476	.2517	.2540	.2508	.2510	.2539	.2481	.2518	.2512	.2499
65,000	.2546	.2541	.2505	.2543	.2567	.2533	.2533	.2560	.2515	.2545	.2539	.2526
66,000	.2570	.2565	.2535	.2565	.2585	.2562	.2565	.2581	.2539	.2570	.2564	.2551
67,000	.2603	.2590	.2565	.2588	.2616	.2590	.2585	.2615	.2564	.2602	.2592	.2579

Copper cylinders for pressure gauges—Continued.

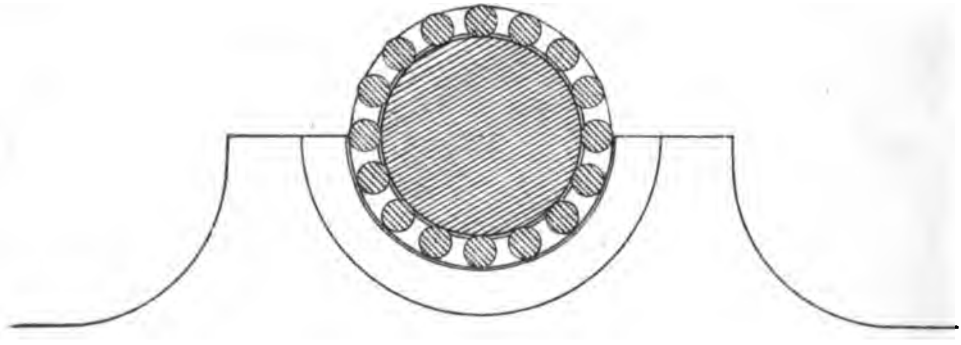
Load per square inch on crusher gauge $\frac{1}{10}$ square inch area.	Total compression.											Mean corrected sets.
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	Mean.	
Pounds.	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*	*Inch.*
68,000	.2625	.2619	.2586	.2622	.2642	.2615	.2612	.2638	.2587	.2630	.2018	.2606
69,000	.2648	.2644	.2614	.2642	.2666	.2640	.2636	.2664	.2617	.2654	.2642	.2630
70,000	.2671	.2665	.2638	.2668	.2683	.2668	.2658	.2684	.2641	.2676	.2665	.2653
71,000	.2695	.2690	.2656	.2696	.2711	.2689	.2678	.2709	.2667	.2710	.2690	.2678
72,000	.2720	.2713	.2679	.2717	.2733	.2714	.2707	.2735	.2689	.2726	.2713	.2701
73,000	.2740	.2733	.2703	.2740	.2755	.2734	.2725	.2747	.2712	.2744	.2733	.2721
74,000	.2763	.2755	.2728	.2759	.2777	.2754	.2748	.2769	.2733	.2769	.2755	.2743
75,000	.2785	.2776	.2749	.2779	.2800	.2775	.2769	.2792	.2755	.2794	.2777	.2765
76,000	.2804	.2798	.2764	.2804	.2823	.2799	.2788	.2816	.2780	.2815	.2799	.2787
77,000	.2826	.2817	.2787	.2824	.2837	.2820	.2809	.2834	.2800	.2834	.2819	.2807
78,000	.2845	.2837	.2806	.2852	.2856	.2837	.2828	.2856	.2823	.2851	.2839	.2827
79,000	.2864	.2858	.2828	.2863	.2878	.2859	.2849	.2871	.2839	.2873	.2858	.2846
80,000	.2886	.2877	.2848	.2883	.2896	.2876	.2878	.2900	.2861	.2895	.2880	.2868
81,000	.2903	.2897	.2863	.2902	.2916	.2898	.2889	.2915	.2879	.2913	.2898	.2886
82,000	.2922	.2914	.2879	.2919	.2934	.2914	.2904	.2932	.2900	.2934	.2915	.2903
83,000	.2940	.2031	.2902	.2937	.2951	.2934	.2929	.2952	.2918	.2950	.2934	.2922
84,000	.2957	.2951	.2920	.2953	.2969	.2949	.2938	.2970	.2937	.2967	.2951	.2941
85,000	.2970	.2968	.2936	.2973	.2990	.2966	.2951	.2986	.2952	.2984	.2968	.2958
86,000	.2991	.2983	.2951	.2988	.3005	.2983	.2971	.3005	.2969	.3000	.2985	.2975
87,000	.3010	.3000	.2971	.3004	.3023	.2998	.2989	.3020	.2987	.3021	.3002	.2992
88,000	.3023	.3017	.2987	.3021	.3040	.3016	.3009	.3035	.3005	.3034	.3019	.3009
89,000	.3038	.3032	.3004	.3039	.3055	.3032	.3025	.3050	.3022	.3055	.3035	.3025
90,000	.3054	.3044	.3020	.3054	.3069	.3044	.3037	.3070	.3034	.3069	.3050	.3040
91,000	.3070	.3063	.3033	.3068	.3084	.3065	.3050	.3088	.3049	.3081	.3065	.3055
92,000	.3086	.3077	.3051	.3085	.3098	.3075	.3067	.3100	.3067	.3098	.3080	.3071
93,000	.3102	.3090	.3065	.3100	.3111	.3090	.3080	.3115	.3087	.3113	.3096	.3086
94,000	.3117	.3108	.3076	.3120	.3129	.3105	.3097	.3129	.3102	.3129	.3111	.3102
95,000	.3128	.3123	.3093	.3128	.3144	.3124	.3114	.3145	.3114	.3144	.3126	.3117
96,000	.3143	.3136	.3105	.3143	.3157	.3135	.3130	.3158	.3125	.3160	.3139	.3130
97,000	.3155	.3148	.3120	.3155	.3171	.3150	.3140	.3174	.3144	.3170	.3153	.3144
98,000	.3170	.3161	.3132	.3170	.3183	.3164	.3152	.3189	.3155	.3181	.3166	.3157
99,000	.3183	.3176	.3145	.3181	.3196	.3178	.3165	.3200	.3169	.3196	.3179	.3170
100,000	.3200	.3188	.3161	.3197	.3209	.3190	.3180	.3216	.3180	.3208	.3193	.3184

ROLLER-BEARING TESTS.

Roller Bearing Tests



Weight of lead and hubs 2870 lbs.



Cast iron box

ROLLER-BEARING TESTS.

In the following tests two types of roller bearings were used, those made by the Mossberg and Granville Manufacturing Company, which had rollers the full length of the bearings, and those made by The Ball Bearing Company, in which a number of short rolls made up each set.

Rotary movement was imparted to the system of lead weights, drums, and axles by means of a 175-pound weight and cord. A number of turns of the weight cord was taken around the drum of one of the lead weights and the weight allowed to fall the distance stated in the details of the tests.

The diameter of the cord, a braided linen line, was ″.23.

The number of rotations recorded includes the total number made from the starting of the weight in its descent until rotation ceased.

There was a tendency in the bearings to drift laterally, which caused the clearance between the cast-iron boxes and the hubs of the lead weights to be taken up and introduced endwise friction against the cast-iron boxes.

The shafts were adjusted at times to keep the ends free from frictional resistance.

Supplementary tests followed on plain journal bearings.

No. 1.

ROLLER BEARING MADE BY THE MOSSBERG AND GRANVILLE MANUFACTURING COMPANY, PROVIDENCE, R. I.

Length of bearing, 7″.80.
Diameter of rollers, ″.50.
Number of rollers, 16.
Diameter of journal, 3¼″.
Weight of journal, 90¼ pounds.
Diameter of cast-iron box, 4¼″.
Diameter of weight drum, 5″.
Weight used, 175 pounds.
Distance dropped, 15′ 10¼″.

No. of experiment.	Number of rotations.	Remarks.
1	....	
2	73	
3	120	
4	118	
5	138	
6	149	
7	154	
8	153	
9	151	
10	175	
		Direction of rolling reversed.
11	159	
12	165	
13	175	
14	226	
		The rollers in the bearing are brightened at their south ends.
15	137	
		Bearing of rollers worked over to new surface in the cast-iron box. Cord wound around the south hub. Sleeve has worked over to north end of box.
16	....	
17	150	
		Sleeve jacked back into central position on box.
18	118½	
19	97	
20	118½	
21	106	Both ends free.
22	93½	Bearing oiled.
23	73½	Bearing washed with benzine.
24	84	End free.
25	65	
26	90½	Do.
27	103	Do.
		Rested 16 hours. Shaft and roller bearing turned end for end in the cast-iron box.
28	64	
29	69	
30	73½	Ends free.
		Endwise drift southward.
31	83	Direction of rotation reversed.

No. 2.

ROLLER BEARING, MADE BY THE BALL BEARING COMPANY, BOSTON, MASS. SHORT-LENGTH ROLLERS.

Shaft turned down to 3″.23 diameter to fit freely the roller bearing with short-length rollers, and test then resumed, using a new cast-iron box fitted to the present roller bearing.

Length of bearing, 8.″60.
Diameter of rollers, ⅜″.
Number of sets of rollers (10 in a set), 20.
Total number of rollers, 200.
Diameter of journal, 3″.23.
Weight of journal, 90¼ pounds.
Diameter of cast-iron box, 4″.
Diameter of weight drum, 5″.
Weight used, 175 pounds.
Distance dropped, 15′ 10¼″.

No. of experiment.	Number of rotations.	Remarks.
1	105	Weight struck a pile of boards in descent.
2	112½	Do.
3	118	
4	124	Roller bearing tends to drift to the south.
5	128½	
6	129½	
7	136	End free.
8	133	Do.
9	136	Do.
10	137½	Do.
		Reversed direction of rotation.
11	121	
12	117	
13	120½	End free.
14	123½	
15	124½	Ends free.
16	125	Ends free, bearing drifts northward.
17	125½	Ends free.
18	124¼	
19	125¾	
20	130	End free.
21	129	
		Bearing oiled.
22	103½	
		Bearing washed with benzine.
23	90	
24	108½	
25	105	
26	117¼	
27	117¾	
28	122½	
29	123	
30	125¼	
31	124¾	

No. 3.

ROLLER BEARING, MADE BY THE MOSSBERG AND GRANVILLE MANUFACTURING COMPANY, PROVIDENCE, R. I.

Length of bearing, 3″.55.
Diameter of rollers, ⅜″.
Number of rollers, 28.
Diameter of journal, 5″.
Weight of journal, 93¾ pounds.
Diameter of cast-iron box, 5″.75.
Diameter of weight drum, 5″.
Weight used, 175 pounds.
Distance dropped, 16′ 1¼″.

No. of experiment.	Number of rotations.	Remarks.
1	140¾	
2	161⅛	Bearing drifts southward.
3	172	
4	169	
5	174¼	
6	162	Ends free.
7	159	
8	159	
9	161¾	
10	161⅛	
11	159¾	
12	164⅛	
13	150	Bearing drifted 13/16″ to the south. Brought back to place again. Rested 16 hours.
14	146	
15	162	
16	168¼	
17	169¼	
18	168⅛	
19	168⅝	
20	168	
		Bearing drifted ⅜″ to the south. Brought back to place again.
21	160⅜	
22	164	
23	169¼	
24	169¼	
25	171¾	
26	169¾	
27	163	
		Bearing drifted 11/16″ to the south. Brought back to place again.
28	161	
29	173⅛	
30	168⅛	
31	159¾	

No. 4.

ROLLER BEARING, MADE BY THE BALL BEARING COMPANY, BOSTON, MASS. SHORT-LENGTH ROLLERS.

Length of bearing, 3″.94.
Diameter of rollers, ″.50.
Number of sets of rollers (4 in a set), 23.
Total number of rollers, 92.
Diameter of journal, 5″.
Weight of journal, 93¾ pounds.
Diameter of cast iron box, 6″.
Diameter of weight drum, 5″.
Weight used, 175 pounds.
Distance dropped, 16′ 1¼″.

No. of experiment.	Number of rotations.	Remarks.
1	123½	
2	137	
3	142½	
4	129	
5	121	
6	113	
7	115	
8	108½	
9	114¼	
10	114¼	
11	117¾	
12	116¾	
13	119	
		Weight on south end drifted ¼″ to south; bearing moved ⅛″ to north. Readjusted.
14	120	
15	122¼	
16	138½	
17	135¼	
18	142½	
19	144	
20	130	
		Shaft worked to the north ⅜″; bearing all right in box. Shaft readjusted.
21	127¾	
22	139	
23	148	
24	146¼	
25	145½	
26	144¼	
27	143½	
		Shaft worked to the north 3/16″; bearing worked to north ⅛″. Readjusted.
28	136¼	
29	149¼	
30	149¼	
31	146	

Five-inch steel journal used in tests Nos. 3 and 4, now tested without roller bearings.

In these tests the journal was started by hand; the 175-pounds weight not being sufficient to cause the journal to begin to rotate. The same lead weights used (2,870 pounds) as in previous tests.

No. 5.

CAST-IRON BOX LINED WITH BABBITT METAL.

Length of journal bearing, 4½″.
Diameter of box, 5″.
Diameter of weight drum, 5″.
Weight used, 175 pounds.
Distance dropped, 16′ 1¼″.

No. of experiment.	Number of rotations.	Lubricant used.	Remarks.
1	17	Albany grease....	
2	18¾	.....do	
3	19¾	.....do	
4	21¼	.....do	
5	20¼	.....do	
6	23¼	.....do	
7	21¼	.....do	
8	21	.....do	
9	27¼	Grease and oil	
10	27¾	.....do	
11	27¾	Grease............	
12	24¼	None	
13	29	Grease............	
14	25	.....do	

No. 6.

CAST-IRON BOX.

Length of journal bearing, 4½″.
Diameter of box, 5″.
Diameter of weight drum, 5″.
Weight used, 175 pounds.
Distance dropped, 15′ 10¼″.

No. of experiment.	Number of rotations.	Lubricant used.	Remarks.
1	29¾	Albany grease....	
2	11½	.....do	
3	24½	.....do	
4	28	.....do	
5	28¾	.....do	
6	28½	.....do	
7	28	.....do	
8	29¾	.....do	
9	25½	Grease and oil	
10	15	.....do	
11	23¼	Grease............	
12	4½	None	The journal now had to be rotated by hand until the weight reach the floor.
13	28	Grease............	
14	31	.....do	

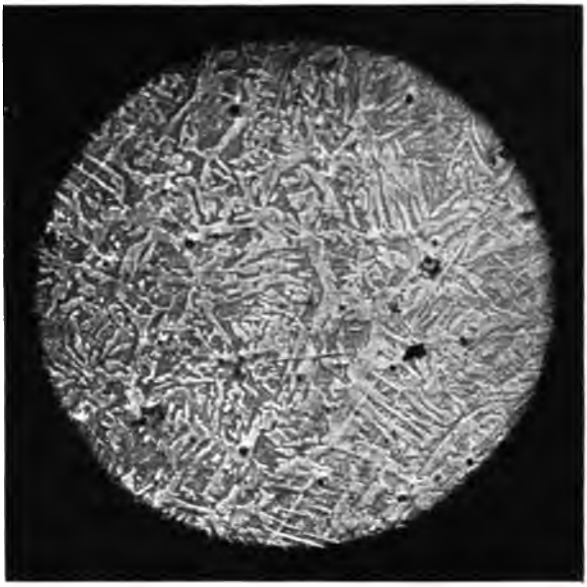
No. 7.

CAST-IRON BOX LINED WITH BRASS.

Length of journal bearing, 4½″.
Diameter of box, 5″.
Diameter of weight drum, 5″.
Weight used, 175 pounds.
Distance dropped, 16′ 1¼″.

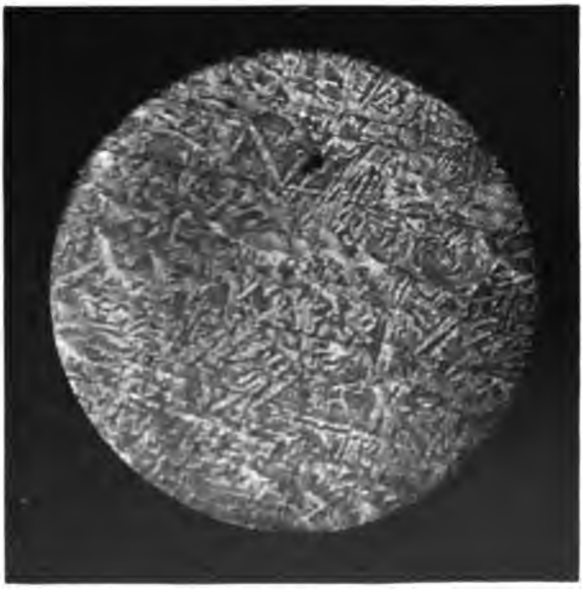
No. of experiment.	Number of rotations.	Lubricant used.	Remarks.
1	24	Albany grease....	
2	17½	.....do	
3	23½	.....do	
4	17½	.....do	
5	21	.....do	
6	26	.....do	
7	18¾	.....do	
8	15¾	.....do	
9	17½	Grease and oil....	
10	4½	.....do	The journal now had to be rotated by hand until the weight reached the floor.
11	25¾	Grease............	
12	30½	.....do	
13	19	None	
14	29¼	Grease............	

PHOTOMICROGRAPHS.



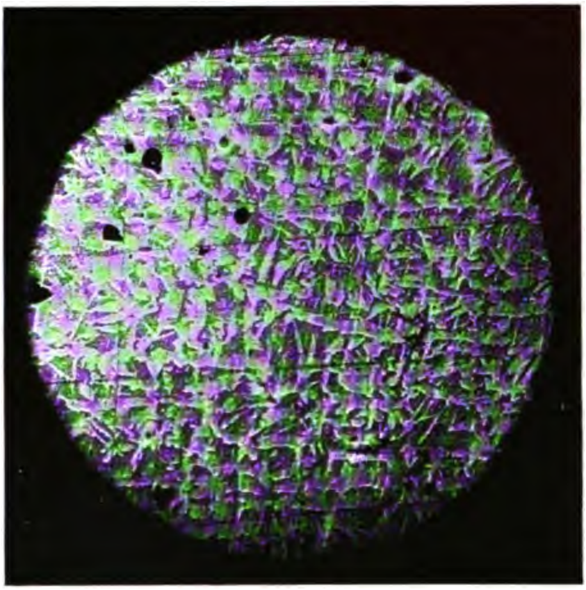
STEEL RAIL NO. 22.

Center of head.
Polished in relief.
Magnified 85 diameters.
See Report 1891, pages 341, 424, 426, for transverse and tension tests.



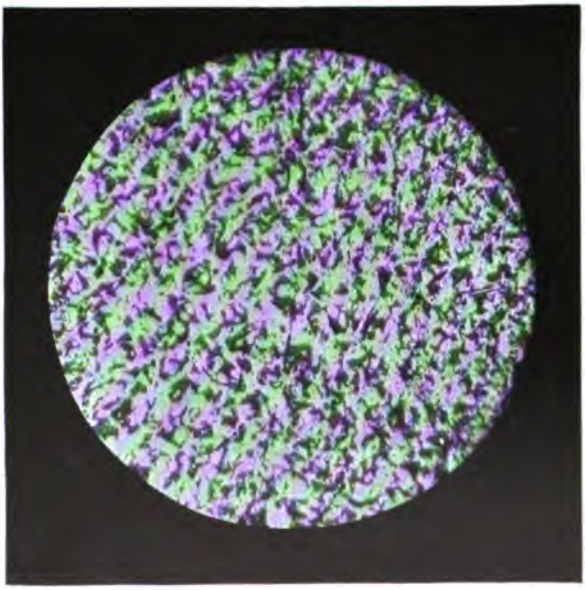
STEEL RAIL NO. 22.

Near top of head.
Polished in relief.
Magnified 85 diameters.



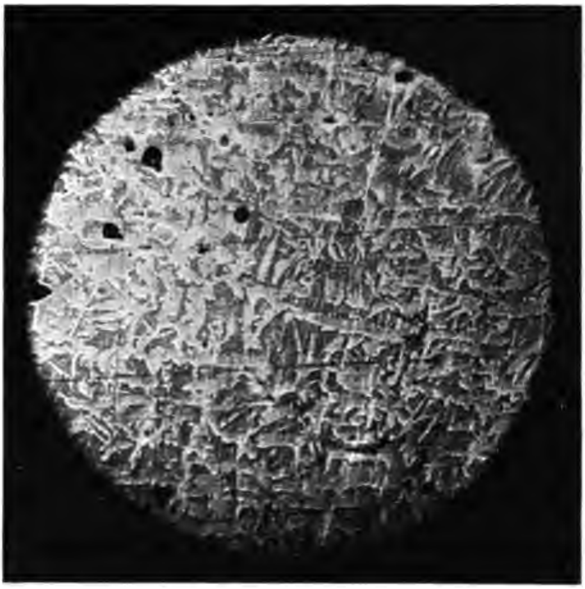
STEEL RAIL NO. 22.

Middle of web.
Polished in relief.
Magnified 85 diameters.



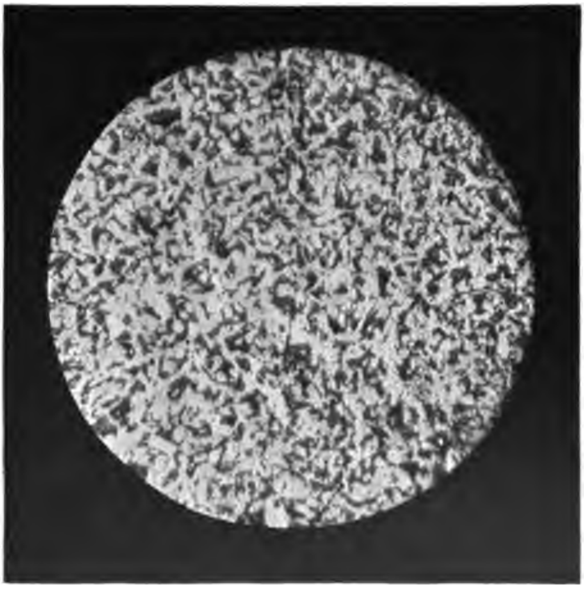
STEEL RAIL NO. 22.

Middle of web.
Etched.
Magnified 83 diameters.



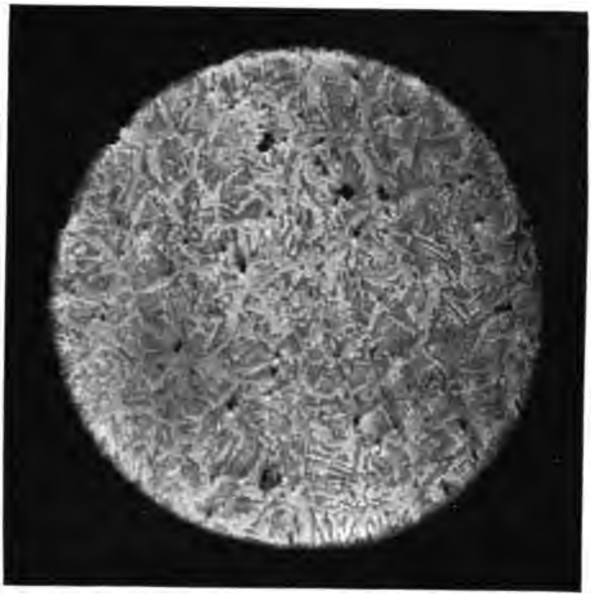
STEEL RAIL NO. 22.

Middle of web.
Polished in relief.
Magnified 85 diameters.



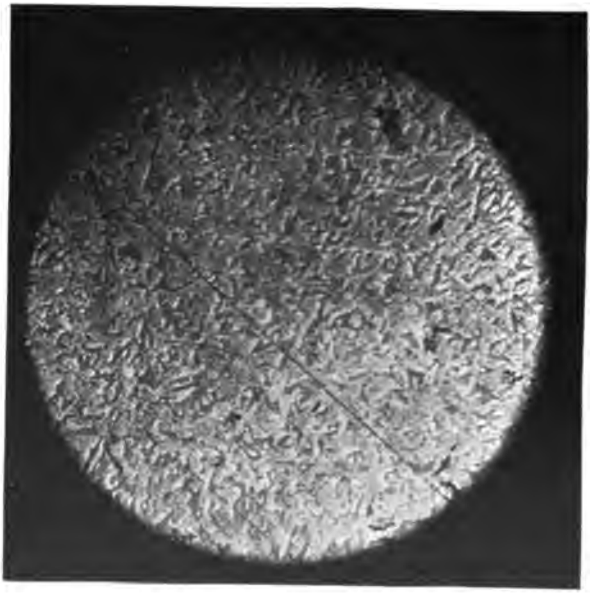
STEEL RAIL NO. 22.

Middle of web.
Etched.
Magnified 83 diameters.



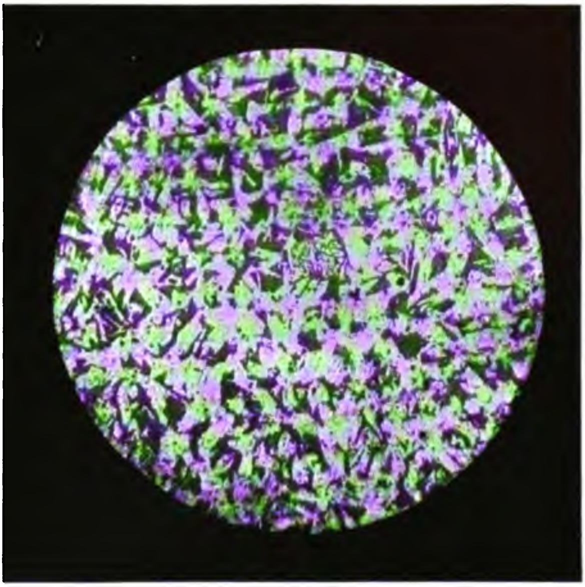
STEEL RAIL NO. 22.

Near lower surface of base.
Polished in relief.
Magnified 85 diameters.



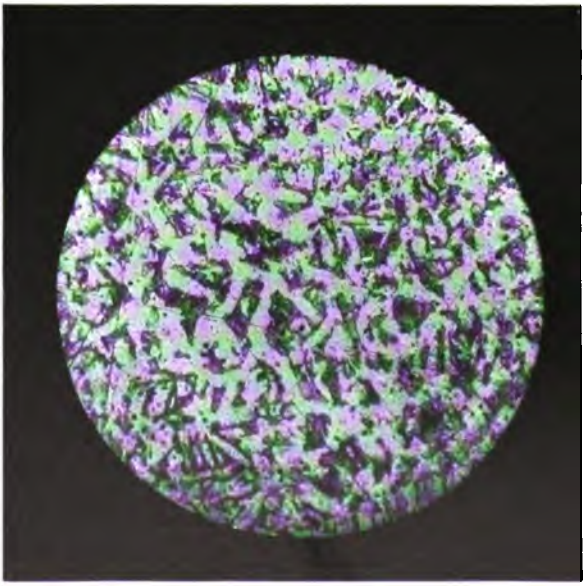
STEEL RAIL NO. 22.

Near outside edge of base.
Polished in relief.
Magnified 85 diameters.



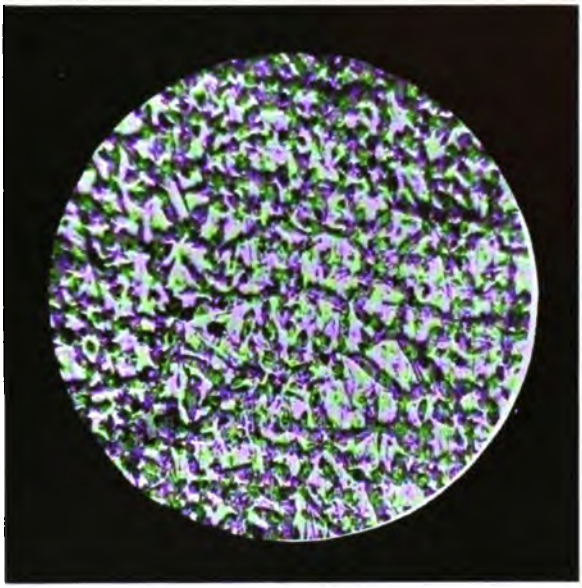
Steel Rail No. 24.

Left center of head.
Magnified 83 diameters.
See Report 1891, pages 346, 424, 426, for transverse and tension tests.



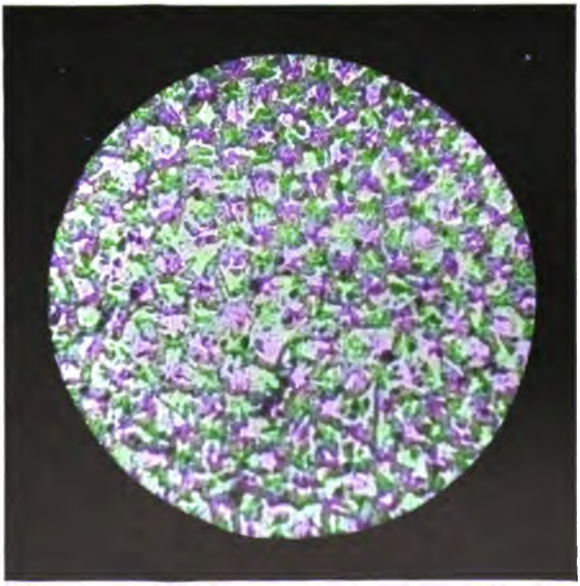
Steel Rail No. 24.

Middle of web, near base.
Magnified 83 diameters.



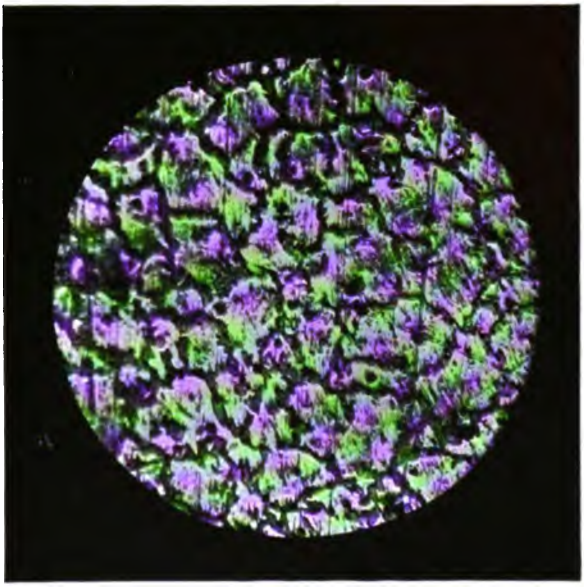
STEEL RAIL NO. 36.

Right lower middle part of head.
Magnified 85 diameters.
See Report 1891, pages 376, 424, 426, for transverse and tension tests.



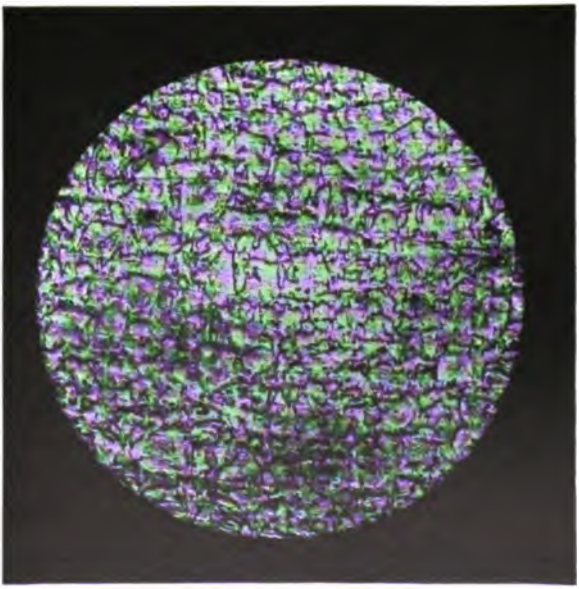
STEEL RAIL NO. 36.

Left lower middle part of head.
Magnified 85 diameters.



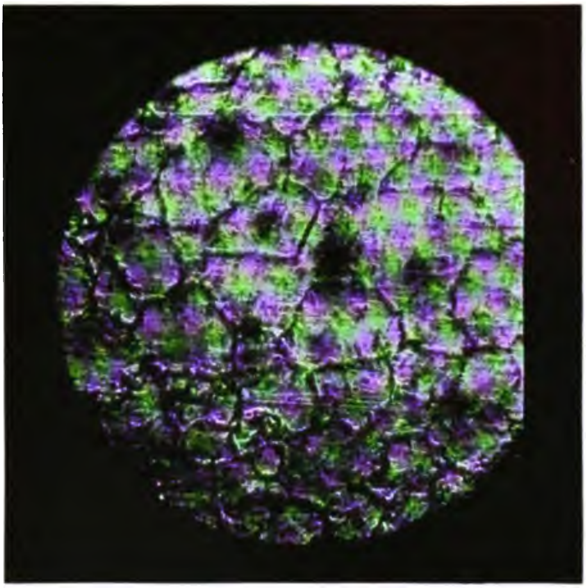
STEEL RAIL NO. 36.

Lower middle part of head.
Magnified 85 diameters.



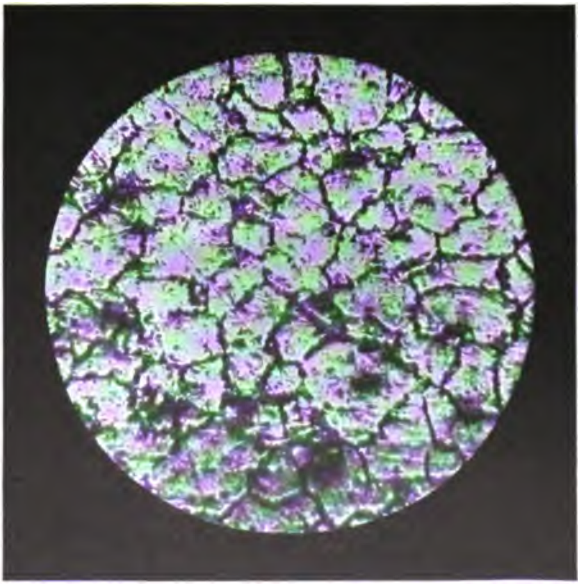
STEEL RAIL NO. 36.

Web, near rolled surface.
Magnified 85 diameters.
See Report 1891, pages 376, 424, 426, for transverse and tension tests.



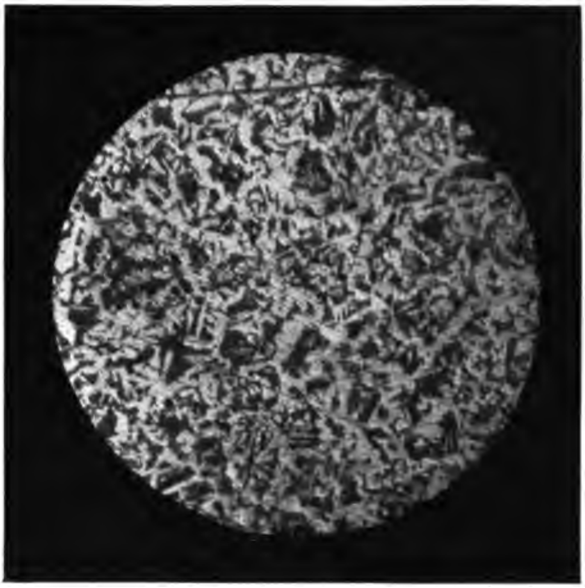
STEEL RAIL NO. 36.

Center of web.
Magnified 85 diameters.



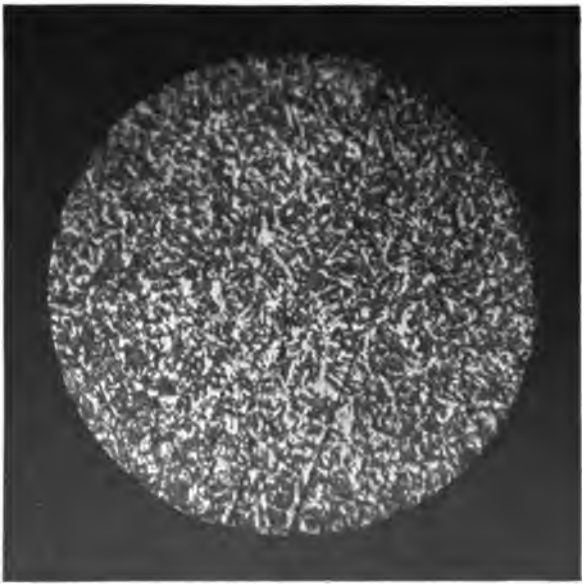
STEEL RAIL NO. 36.

Middle of web, under the head.
Magnified 85 diameters.



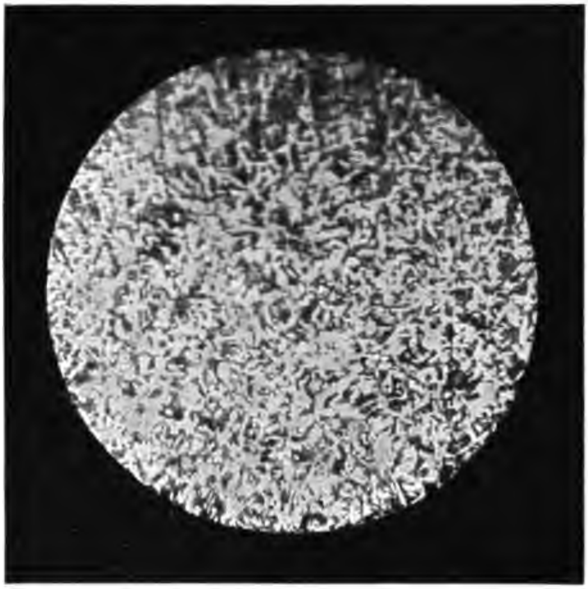
STEEL FOR RECEIVERS, .30 CALIBER RIFLES.

Marks, 36 R.
Tension test No. 5795.
Magnified 83 diameters.



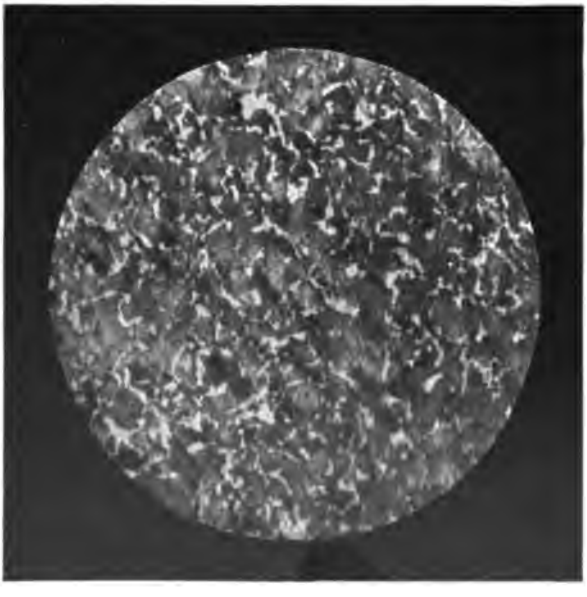
STEEL FOR RECEIVERS, .30 CALIBER RIFLES.

Marks, 36 R F.
Tension test No. 5796.
Magnified 83 diameters.



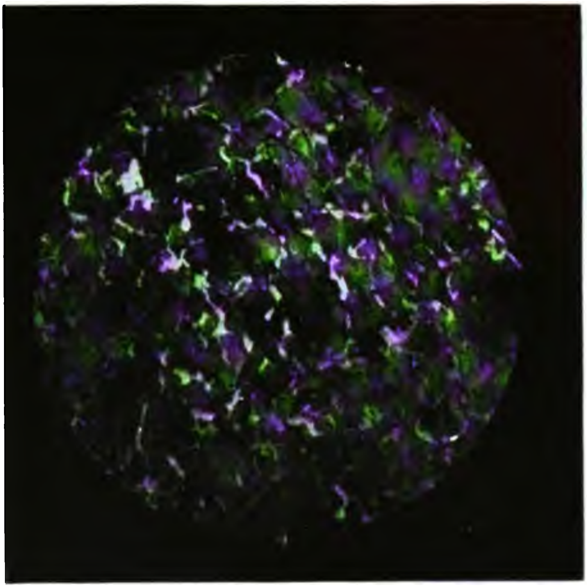
STEEL FOR RECEIVERS, .30 CALIBER RIFLES.

Marks, 37 R F_2.
Tension test No. 6085.
Magnified 83 diameters.



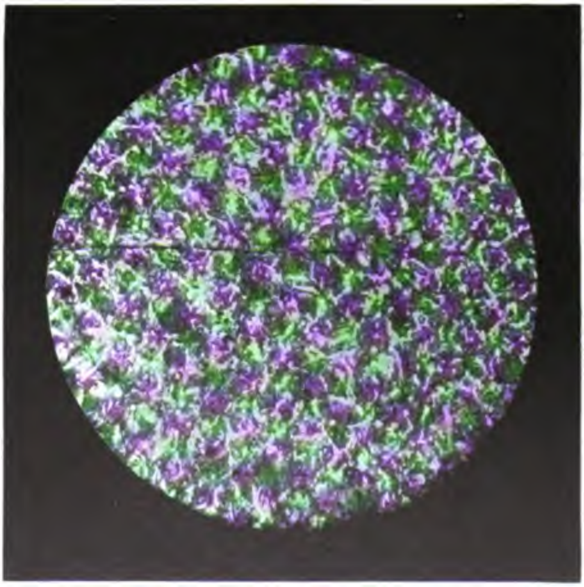
STEEL FOR RIFLE BARRELS, .30 CALIBER.

Marks, 78.
Tension test No. 5901.
Magnified 83 diameters.



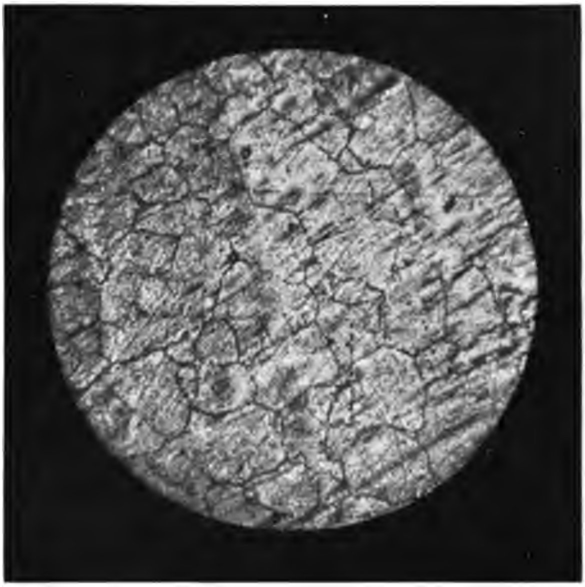
STEEL FOR RIFLE BARRELS, .30 CALIBER.

From butt of finished barrel.
Marks, 78.
Tension test No. 5905.
Magnified 83 diameters.



RIFLE-BARREL STEEL, .30 CALIBER.

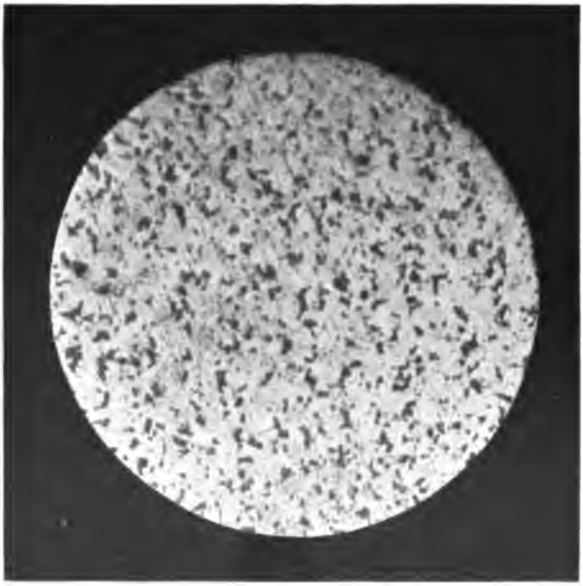
Marks, 79.
Magnified 83 diameters.



STEEL FOR JACKET, 3″.2 B. L. RIFLE.

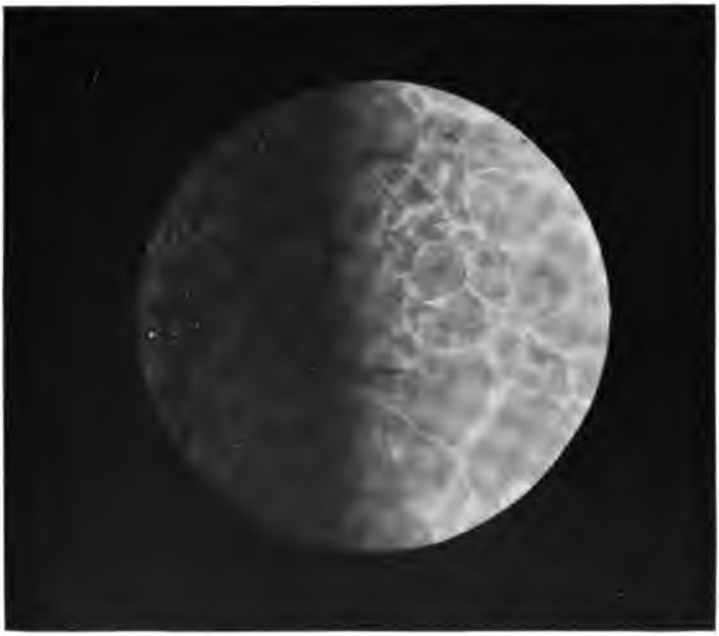
Marks, 32 R
193 J
M T$_1$ O

Tension test No. 5790.
Magnified 83 diameters.



GAUTIER STEEL. 1.09 PER CENT CARBON.

Magnified 83 diameters.



TUBE OF 5-INCH B. L. RIFLE.

From fragment of burst gun.

The two dark lines show thermal cracks penetrating the walls of the tube from the surface of the bore.

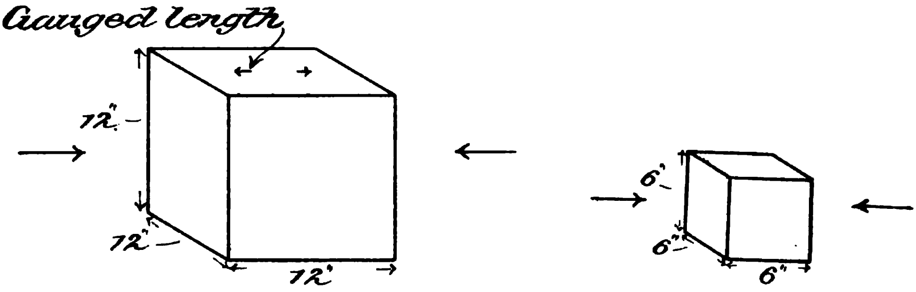
Magnified 83 diameters.

CONCRETE AND MORTAR TESTS.

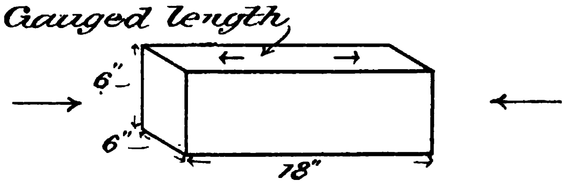
Concrete specimens.

Nominal dimensions.

— Cubes. —



— Prisms. —



CONCRETE AND MORTAR TESTS.

Three series of concrete and mortar tests are here presented: A series of 544 cubes furnished by the State of New York, made under the direction of George W. Rafter, C. E., in charge of the Genesee River storage project; a series of 84 cinder concrete cubes furnished by The Eastern Expanded Metal Company, Mr. Everett Morse, vice-president, Boston, and 95 cubes and prisms made at the Watertown Arsenal.

The cubes from the State of New York represent the several brands of Portland cements manufactured in that State in the year 1896.

The manufacturers' names and brands were as follows: The Wayland Portland Cement Company, Genesee; Thomas Millem & Sons, Wayland; The Glen Falls Portland Cement Company, Iron Clad; The Empire Portland Cement Company, Empire; The Sand-Silica Cement Company, Champion; also the Buffalo Portland and the Buffalo natural cements.

The stone used was Portageville, N. Y., sandstone, hand broken to pass through a 2-inch ring.

In the cinder concretes six brands of cements are represented, as follows: Germania, Cathedral, Alpha, Atlas, Knickerbocker, and Victor.

The cinder used was described as being in the condition it came from the furnace, not sifted, only the larger clinkers having been broken, representing material as used commercially.

The arsenal concretes were chiefly made with Alpha cement, the other brands used being Egypt, Star, Standard, and Steel.

Referring to the tests on the concrete from the State of New York, Table No. 1 shows the composition and treatment of the concrete and the ages of the several cubes.

Those cubes designated with a plain numeral were placed, when taken from the molds, in water for a period of about 4 months, after which they were buried in sand for a further period of 1 year, 1 month, and 10 days. Then they were taken out for shipment to Watertown Arsenal.

Those bearing the letter *a* were seasoned in a cool cellar after leaving the molds; those with the letter *b* were exposed to the weather, while those with the letter *c* were covered with burlap and wet several times a day for a period of about 3 months, thereafter being exposed to the weather.

After the above-mentioned treatment the cubes were all shipped to the Watertown Arsenal, where they remained in the testing room until they were tested.

Table No. 2 states the consistency of the mortar, weights per cubic foot of the concrete when tested, dimensions of the cubes, the load which caused the first crack to appear, and the ultimate strength of the material.

In regard to the consistency of the mortar the terms dry, plastic, and excess were chosen to represent mortars containing different amounts of water.

Mr. Rafter says:

> "In the dry blocks the mortar was, generally speaking, only a little more moist than damp earth. Such blocks required a large amount of ramming in order to flush the water to the surface. In the plastic blocks the mortar was made of the ordinary consistency used by the average mason. A moderate amount of ramming brought the water to the surface of these blocks. In the excess blocks the water was so far in excess that the concrete quaked like liver under moderate ramming."

Table No. 3 shows data taken from the details of those tests in which micrometer observations were made on the elastic properties of the concretes. The moduli of elasticity were computed for three different ranges of stresses, arbitrarily selected, and with the permanent sets given for corresponding loads.

In this, as in other tests of concretes, great variations in the values of the moduli of elasticity are found, and the same is true with reference to the development of permanent sets, although the irregularities of the latter are generally less pronounced than those of the former.

Notwithstanding these irregularities, which, in a material of this kind, are to be expected in some degree, there is evidence presented that to the stronger mixtures belong higher values of the modulus of elasticity, while certainly the sets are smaller under corresponding loads in the stronger mixture.

In individual tests smaller values of the modulus of elasticity are displayed as the loads of compression advance.

Table No. 4 shows the elastic properties of mortar.

Table No. 5, compiled from No. 1, shows the strength of concretes with reference to the composition of the mortar and the quantity used, showing decisively the loss in strength of the concrete as the leaner mixtures of mortar are used.

These results are again shown graphically on diagrams Nos. 1 and 2.

Diagram No. 2 further shows the strength of mortars of the same composition as those used in the manufacture of the concretes. It will be observed that the curves of strength of mortar and concrete converge and become nearly the same in the leaner mixtures here represented.

Table No. 6, condensed from No. 5, shows the mean compressive strength of the concrete with reference to the quantity of mortar used.

Excepting the results with the Genesee cement, it does not appear that any material difference in strength is found between the concretes having 33 per cent of mortar in terms of the broken stone and 40 per cent of the stone.

Table No. 10, however, should be considered at this time. This table shows the mean weight of the two concretes of different percentages of mortar to be nearly identical. Since the mortar weighs less per cubic foot than the stone, it follows that the 40 per cent mixture should weigh less than the 33 per cent mixture; there being practically no difference leads to the inference that the mortar in the latter mixture was insufficient to fill the voids in the stone.

Table No. 7 shows the strength of the concrete with reference to the consistency of the mortar, wherein it appears that the "dry" mortar gave the greatest strength, the "plastic" next in order, and the "excess" mortar the least.

Table No. 8, referring to the treatment of the concrete, shows the greatest strength displayed by the blocks which were immersed in water for a period after leaving the molds. Next, those which were covered with wet burlap, then the specimens which seasoned in a cool cellar, and the least strength in those cubes which were exposed to the weather throughout their aging.

Tables Nos. 9 to 12 inclusive refer to the weights of the concrete, wherein it is shown that the weight diminishes as leaner mixtures are used. With the Genesee brand of cement and 1 to 1 mortar the concrete weighed 146.5 pounds per cubic foot, whereas in the 1 to 6 mortar the mean weight was 139.5 pounds per cubic foot.

The results in Table No. 10, pertaining to the influence of the quantity of mortar used, have already been referred to.

Taking from Table No. 10 the mean of all of the samples represented, the difference in the weights of the different consistencies of mortar does not reach 1 pound per cubic foot.

Concerning the treatment after setting, as shown in Table No. 12, the specimens which were kept in a cool cellar weighed the least, while among the other groups the difference in weights was not very pronounced.

Tables Nos. 13 to 18 inclusive refer to the mortar tests and correspond with Tables Nos. 5 to 12 inclusive, so far as the mortars and concretes admit of corresponding tables.

Table No. 13 shows the loss in strength as the mortar is made of leaner proportions.

So far as the number of specimens permit of taking mean results, Table No. 14 shows greatest strength for the "dry" mixed mortar, and lower strength as more water was successively used.

The mortar cubes which were immersed in water show the greatest strength, as exhibited in Table No. 15, while among the other cubes comparatively unimportant differences exist.

Table No. 16 shows the reduction in weight as the mixtures are made leaner.

An insufficient number of specimens appear in Table No. 17 to admit of comparisons being made.

The mortar cubes stored in a cool cellar weighed less than the other groups. Necessarily the corresponding groups of concrete and mortar cubes behave in a similar manner when the mortar must be the variable component in each case.

When examining the elastic properties there were instances in which the micrometer indicated an apparent lengthening of the specimen as the loads continued to advance, a result attributed to local influences, such as the close proximity of one end of the micrometer to a fragment of stone which may have rotated slightly in place.

Again, a more marked change in the direction of the micrometer reading occurred while rupture was in progress, by reason of the pyramidal-shaped fragments detached from the sides of the cubes, which recover from their state of compression when detached from the central parts of the specimen.

The cinder concretes were described as having been mixed rather dry, the amount of water ranging from 10 to 12½ pounds per cubic foot of concrete.

The specimens were thoroughly tamped about every 2 inches. After having been removed from the molds, they were stored in the air, and during the early stages were covered with burlap and sprinkled with water.

Table No. 1 gives the general data of the tests.

Table No. 2, compiled from No. 1, states the mean compressive strength, and a column in the table shows the gain in strength by the older of the two groups of cubes. A diagram also follows which shows the gain in strength due both to composition and to age.

The older group of cinder concretes showed a decided loss in weight, Table No. 3 having been prepared to show the extent of this behavior. The table further shows the reduction in weight of the leaner mixtures.

Table No. 4, on the elastic properties, shows the moduli of elasticity and permanent sets, higher values appearing in the former property as richer mixtures are reached.

The arsenal concretes were made for the most part of a 1:1:3 mixture, using Alpha cement, bank sand, and pebbles from the arsenal grounds and broken trap rock from a quarry at Waltham, Mass.

Cubes of different ages from 7 days to 73 days are represented.

The trap rock was rescreened into a larger number of sizes than commercially furnished.

In the statement of sizes the diameter of the larger of two screens is given, the one through which all the stone passed; the screen of the next smaller diameter intercepted all of that size; thus, ¾'' stone means that which has passed through a ¾'' screen and was intercepted by a ½'' screen.

All of the arsenal specimens were examined for elastic properties.

The general results with the 12-inch cubes are given in Tables Nos. 1 and 2, the elastic properties in Tables Nos. 3 and 4.

Summarized Table No. 5 was prepared for the more convenient examination of the results with reference to the influence of size of broken stone in the strength of the concrete and for comparing concretes made of one-sized stone, those of mixed sizes, and the relative strength of broken stone and pebble concrete.

Table No. 6 shows the weights and volumes of the ingredients used and the quantity of concrete produced, together with the weight per cubic foot of the specimens taken at the time of testing. The original mixture not being sufficient to make four cubes, the number generally made, a sufficient quantity of the same composition and consistency was made to supply the deficiency and used in the fourth specimen of each kind. The ingredients were tamped when the above determinations were made.

Table No. 7 refers to the weights and volumes of the mortars.

Table No. 8 shows the voids in the trap rock, sand, and gravel.

The details and tabulations of cement and mortar prisms follow the results of the 12-inch cubes.

NOTE.—The original data on the composition of the concretes from the State of New York stated the proportions of the dry ingredients, sand and cement, used in making the mortar, and the quantity of mortar used in the concrete in terms of the broken stone.

Subsequently Mr. Rafter supplied figures showing the composition with reference to the dry ingredients, which figures are used in certain of the tables of this report, the arrangement of the results, however, is with reference to the volume of the mortar used and its consistency.

CONCRETE CUBES

FROM

STATE OF NEW YORK.

No. 9650.

Marks, 7.
Composition: Genesee cement, 1; sand, 1; broken stone, 4.71.
Consistency of mortar, dry.
Age, 1 year 9 months 5 days.
Set in mold 23 hours, in water 4 months 17 days; buried in sand 1 year 1 month 10 days, in air 3 months 7 days.
Weight per cubic foot, 147.16 pounds.
Sectional area, 144.24 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	.0001	0.	
43,272	300	.0003	0.	
57,696	400	.0005	0.	
86,544	600	.0009	.0002	E = 3,571,000.
115,392	800	.0015	.0003	
144,240	1,000	.0021	.0005	E = 2,812,000.
173,088	1,200	.0028	.0007	
201,936	1,400	.0036	.0009	E = 1,667,000.
230,784	1,600	.0044	.0012	
259,632	1,800	.0054	.0016	
288,480	2,000	.0066	.0020	
317,328	2,200	.0080	.0024	
346,176	2,400	.0095	.0033	
375,024	2,600	.0111	.0039	
403,872	2,800	.0135	.0055	
432,720	3,000	.0149	.0062	
461,568	3,200	.0175	.0076	First crack.
490,416	3,400	.0197	.0088	
519,264	3,600	.0230	.0107	
548,112	3,800	.0256	.0123	
576,960	4,000	.0289	.0141	
672,000	4,659	....	....	Ultimate strength.

No. 9651.

Marks, 7*a*.
Composition: Genesee cement, 1; sand, 1; broken stone, 4.71.
Consistency of mortar, dry.
Age, 1 year 6 months 25 days.
Set in mold 23 hours, in cool cellar 1 year 5 months 28 days, in air 27 days.
Weight per cubic foot, 145.05 pounds.
Sectional area, 145.05 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,388	100	0.	0.	Initial load.
28,776	200	.0005	.0001	
43,164	300	.0009	.0002	
57,552	400	.0012	.0004	
71,940	500	.0017	.0006	
86,328	600	.0022	.0008	E=1,786,000.
100,716	700	.0028	.0010	
115,104	800	.0035	.0012	
129,492	900	.0043	.0015	
143,880	1,000	.0050	.0019	E=1,452,000.
158,268	1,100	.0059	.0022	
172,656	1,200	.0069	.0027	
187,044	1,300	.0079	.0033	
201,432	1,400	.0089	.0038	
215,820	1,500	.0102	.0045	
230,208	1,600	.0114	.0052	
244,596	1,700	.0127	.0060	
250,000	....	....	....	First crack.
258,984	1,800	.0141	.0071	
273,372	1,900	.0153	.0080	
287,760	2,000	.0168	.0089	
302,148	2,100	.0179	.0097	
316,536	2,200	.0193	.0107	
330,924	2,300	.0206	.0116	
345,312	2,400	.0216	.0125	
359,700	2,500	.0230	.0134	
374,088	2,600	.0241	.0142	
388,476	2,700	.0252	.0151	
402,864	2,800	.0268	.0161	
417,252	2,900	.0281	.0171	
431,640	3,000	.0294	.0180	
583,400	4,055	....	....	Ultimate strength.

No. 9654.

Marks, 12.
Composition: Genesee cement, 1; sand, 1; broken stone, 5.25.
Consistency of mortar, plastic.
Age, 1 year 9 months 14 days.
Set in mold 23 hours, in water 4 months 15 days; buried in sand 1 year 1 month 10 days, in air 3 months 19 days.
Weight per cubic foot, 147.54 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	.0001	0.	
43,236	300	.0003	0.	
57,648	400	.0006	0.	
86,472	600	.0012	.0001	E = 2,273,000.
115,296	800	.0019	.0004	
144,120	1,000	.0027	.0006	E = 2,143,000.
172,944	1,200	.0036	.0009	
201,768	1,400	.0046	.0013	
230,592	1,600	.0057	.0016	E = 1,429,000.
259,416	1,800	.0073	.0024	
288,240	2,000	.0089	.0033	
317,064	2,200	.0107	.0042	
345,888	2,400	.0129	.0058	
374,712	2,600	.0147	.0069	
403,536	2,800	.0164	.0079	
430,000	....	....	....	First crack.
432,360	3,000	.0170	.0085	
461,184	3,200	.0178	.0090	
490,008	3,400	.0194	.0097	
518,832	3,600	.0218	.0103	
547,656	3,800	.0252	.0083	Ultimate strength.

No. 9658.

Marks, 16.
Composition: Genesee cement, 1; sand, 1; broken stone, 4.98.
Consistency of mortar, excess.
Age, 1 year 9 months 14 days.
Set in mold 56 hours, in water 4 months 12 days; buried in sand 1 year 1 month 1 day, in air 3 months 21 days.
Weight per cubic foot, 148.40 pounds.
Sectional area, 144.36 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,436	100	0.	0.	Initial load.
28,872	200	.0002	0.	
43,308	300	.0005	.0000	
57,744	400	.0008	.0001	
86,616	600	.0015	.0003	E=2,083,000.
115,488	800	.0022	.0007	
144,360	1,000	.0033	.0011	E=2,045,000.
173,232	1,200	.0046	.0017	
202,104	1,400	.0061	.0023	E=1,163,000.
230,976	1,600	.0081	.0033	
259,848	1,800	.0098	.0043	
288,720	2,000	.0120	.0055	
317,592	2,200	.0142	.0068	First crack.
346,464	2,400	.0169	.0082	
375,336	2,600	.0192	.0097	
404,208	2,800	.0219	.0113	
433,080	3,000	.0246	.0130	
461,952	3,200	.0277	.0151	
490,824	3,400	.0318	.0177	
519,696	3,600	.0479	.0225	
548,100	3,797	.0452	....	Ultimate strength.

No. 9662.

Marks, 1.
Composition: Genesee cement, 1; sand, 2; broken stone, 7.14.
Consistency of mortar, dry.
Age, 1 year 9 months 25 days.
Set in mold 65 hours, in water 4 months 19 days; buried in sand 1 year 1 month 10 days, in air 3 months 24 days.
Weight per cubic foot, 140.73 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	.0001	0.	
43,380	300	.0002	0.	
57,840	400	.0004	0.	
86,760	600	.0008	.0001	E = 3,571,000.
115,680	800	.0012	.0002	
144,600	1,000	.0015	.0004	E = 4,091,000.
173,520	1,200	.0020	.0005	
202,440	1,400	.0025	.0007	E = 2,500,000.
231,360	1,600	.0031	.0009	
260,280	1,800	.0037	.0011	
289,200	2,000	.0045	.0014	
318,120	2,200	.0053	.0016	
347,040	2,400	.0061	.0020	
375,960	2,600	.0071	.0024	First crack.
404,880	2,800	.0082	.0030	
433,800	3,000	.0092	.0034	
462,720	3,200	.0105	.0042	
491,640	3,400	.0120	.0053	
520,560	3,600	.0121	.0063	
532,100	3,680	....	....	Ultimate strength.

No. 9666.

Marks, 17.
Composition: Genesee cement, 1; sand, 2; broken stone, 6.62.
Consistency of mortar, excess.
Age, 1 year 9 months 15 days.
Set in mold 52 hours, in water 4 months 12 days; buried in sand 1 year 1 month 10 days, in air 3 months 23 days.
Weight per cubic foot, 145.30 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	.0015	.0012	
43,380	300	.0036	.0031	
57,840	400	.0057	.0047	
86,760	600	.0088	.0073	E = 1,667,000.
115,680	800	.0119	.0095	
144,600	1,000	.0150	.0118	E = 1,406,000.
173,520	1,200	.0181	.0143	
202,440	1,400	.0220	.0172	
231,360	1,600	.0254	.0199	
260,280	1,800	.0295	.0232	First crack.
289,200	2,000	.0343	.0270	
318,120	2,200	.0390	.0311	
347,040	2,400	.0495	.0395	
375,960	2,600	.0579	.0455	
419,600	2,902	....	....	Ultimate strength.

No. 9670.

Marks, 8.
Composition: Genesee cement, 1; sand, 3; broken stone, 8.93.
Consistency of mortar, dry.
Age, 1 year 8 months 7 days.
Set in mold 40 hours, in water 4 months 16 days; buried in sand 1 year 1 month 10 days, in air 2 months 10 days.
Weight per cubic foot, 144.16 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	.0001	0.	
43,236	300	.0002	0.	
57,648	400	.0004	.0001	
86,472	600	.0009	.0001	E = 3,125,000.
115,296	800	.0015	.0003	
144,120	1,000	.0022	.0005	E = 2,647,000.
172,944	1,200	.0031	.0007	
201,768	1,400	.0039	.0010	E = 1,190,000.
230,592	1,600	.0052	.0014	
259,416	1,800	.0067	.0019	
288,240	2,000	.0090	.0031	
28,824	200	.0033	....	
57,648	400	.0040	....	
86,472	600	.0048	....	
115,296	800	.0057	....	
144,120	1,000	.0063	....	
172,944	1,200	.0070	....	
201,768	1,400	.0076	....	
230,592	1,600	.0081	....	
259,416	1,800	.0087	....	
230,592	1,600	.0084	....	
201,768	1,400	.0081	....	
172,944	1,200	.0077	....	
144,120	1,000	.0075	....	
115,296	800	.0069	....	
86,472	600	.0063	....	
57,648	400	.0055	....	
28,824	200	.0042	.0036	
310,000	....	....	....	First crack.
317,064	2,200	.0112	.0045	
345,888	2.400	.0130	.0055	
374,712	2,600	.0154	.0071	
403,536	2,800	.0184	.0086	
432,360	3,000	.0216	.0105	
474,000	3,289	....	....	Ultimate strength.

No. 9674.

Marks, 2.
Composition: Genesee cement, 1; sand, 3; broken stone, 9.80.
Consistency of mortar, plastic.
Age, 1 year 9 months 19 days.
Set in mold 63 hours, in water 4 months 19 days; buried in sand 1 year 1 month 10 days, in air 3 months 18 days.
Weight per cubic foot, 143.89 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	.0007	.0004	
43,236	300	.0020	.0013	
57,648	400	.0035	.0025	
86,472	600	.0063	.0046	E = 1,471,000.
115,296	800	.0095	.0069	
144,120	1,000	.0124	.0094	E = 1,500,000.
172,944	1,200	.0161	.0120	
201,768	1,400	.0197	.0147	First crack.
230,592	1,600	.0232	.0175	
259,416	1,800	.0273	.0206	
288,240	2,000	.0307	.0229	
317,064	2,200	.0352	.0260	
345,888	2,400	.0395	.0308	
374,712	2,600	.0468	.0341	
403,536	2,800	.0546	.0398	
435,500	3,022	....	....	Ultimate strength.

No. 9678.

Marks, 13.
Composition: Genesee cement, 1; sand, 3; broken stone, 10.14.
Consistency of mortar, plastic.
Age, 1 year 9 months 12 days.
Set in mold 45 hours, in water 4 months 14 days; buried in sand 1 year 1 month 10 days, in air 3 months 17 days.
Weight per cubic foot, 144.08 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	.0004	.0001	
43,236	300	.0008	.0004	
57,648	400	.0013	.0006	
86,472	600	.0025	.0014	E = 2,273,000.
115,296	800	.0040	.0022	
144,120	1,000	.0057	.0036	E = 2,143,000.
172,944	1,200	.0078	.0050	
201,768	1,400	.0100	.0066	
230,592	1,600	.0125	.0083	
250,000	....	....	....	First crack.
259,416	1,800	.0148	.0098	
288,240	2,000	.0173	.0114	
317,064	2,200	.0199	.0132	
345,888	2,400	.0220	.0145	
374,712	2,600	.0261	.0098	
386,300	2,680	....	....	Ultimate strength.

No. 9682.

Marks, 18.
Composition: Genesee cement, 1; sand, 3; broken stone, 9.78.
Consistency of mortar, excess.
Age, 1 year 9 months 22 days.
Set in mold 63 hours, in water 4 months 11 days; buried in sand 1 year 1 month 10 days, in air 3 months 29 days.
Weight per cubic foot, 143.61 pounds.
Sectional area, 145.56 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 556	100	0.	0.	Initial load.
29, 112	200	.0028	.0025	
43, 668	300	.0045	.0039	
58, 224	400	.0058	.0050	
87, 836	600	.0084	.0068	E = 1,562,000.
116, 448	800	.0105	.0084	
145, 560	1, 000	.0126	.0098	E = 1,607,000.
174, 672	1, 200	.0148	.0112	
203, 784	1, 400	.0174	.0130	
232, 896	1, 600	.0202	.0148	First crack.
262, 008	1, 800	.0175	.0113	Cracks developed in vicinity of the micrometer.
291, 120	2, 000	.0197	.0117	
320, 232	2, 200	.0217	.0095	
397, 100	2, 728	....	....	Ultimate strength.

No. 9686.

Marks, 9.
Composition: Genesee cement, 1; sand, 4; broken stone, 12.19.
Consistency of mortar, dry.
Age, 1 year 8 months 6 days.
Set in mold 28 hours, in water 4 months 16 days; buried in sand 1 year 1 month 10 days, in air 2 months 10 days.
Weight per cubic foot, 142.43 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 412	100	0.	0.	Initial load.
28, 824	200	.0003	.0001	
43, 236	300	.0009	.0003	
57, 648	400	.0014	.0007	
86, 472	600	.0031	.0015	E = 1,562,000.
115, 296	800	.0050	.0026	
144, 120	1, 000	.0078	.0044	E = 1,324,000.
172, 944	1, 200	.0106	.0064	
201, 768	1, 400	.0133	.0063	
230, 000	....	....	....	First crack.
230, 592	1, 600	.0165	.0105	
259, 416	1, 800	.0196	.0123	
288, 240	2, 000	.0239	.0149	
317, 064	2, 200	.0278	.0164	
319, 900	2, 220	....	....	Ultimate strength.

No. 9690.

Marks, 14.
Composition: Genesee cement, 1; sand, 4; broken stone, 12.86.
Consistency of mortar, plastic.
Age, 1 year 9 months 10 days.
Set in mold 79 hours, in water 4 months 12 days; buried in sand 1 year 1 month 10 days, in air 3 months 16 days.
Weight per cubic foot, 141.97 pounds.
Sectional area, 144.72 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,472	100	0.	0.	Initial load.
28,944	200	.0042	.0038	
43,416	300	.0079	.0070	
57,888	400	.0112	.0097	
86,832	600	.0160	.0137	E=1,087,000.
115,776	800	.0201	.0172	
144,720	1,000	.0230	.0191	E=1,154,000.
173,664	1,200	.0261	.0215	First crack.
202,608	1,400	.0290	.0236	
306,800	2,120	....	....	Ultimate strength.

No. 9694.

Marks, 3.
Composition: Genesee cement, 1; sand, 4; broken stone, 11.62.
Consistency of mortar, excess.
Age, 1 year 9 months 1 day.
Set in mold 47 hours, in water 4 months 19 days; buried in sand 1 year 1 month 10 days, in air 3 months 1 day.
Weight per cubic foot, 142.69 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	.0002	0.	
43,380	300	.0007	.0001	
57,840	400	.0012	.0003	
72,300	500	.0018	.0006	
86,760	600	.0025	.0009	E=1,562,000.
101,220	700	.0032	.0013	
115,680	800	.0039	.0017	
130,140	900	.0046	.0022	
144,600	1,000	.0055	.0028	E=1,667,000.
159,060	1,100	.0065	.0036	
173,520	1,200	.0076	.0042	
187,980	1,300	.0086	.0049	
202,440	1,400	.0098	.0057	
216,900	1,500	.0106	.0063	
231,360	1,600	.0119	.0073	
245,820	1,700	.0131	.0080	First crack.
260,280	1,800	.0141	.0086	
274,740	1,900	.0158	.0099	
289,200	2,000	.0173	.0109	
303,660	2,100	.0187	.0118	Surface of cube generally cracked. Local effects influenced the micrometer.
318,120	2,200	.0184	.0116	
332,580	2,300	.0165	.0094	
370,800	2,564	....	....	Ultimate strength.

No. 9698.

Marks, 10.
Composition: Genesee cement, 1; sand, 5; broken stone, 14.70.
Consistency of mortar, dry.
Age, 1 year 8 months 3 days.
Set in mold 23 hours, in water 4 months 16 days; buried in sand 1 year 1 month 10 days, in air 2 months 7 days.
Weight per cubic foot, 139.35 pounds.
Sectional area, 144.24 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	.0007	.0004	
43,272	300	.0015	.0010	
57,696	400	.0030	.0021	
72,120	500	.0041	.0029	
86,544	600	.0061	.0043	E=1,389,000.
100,968	700	.0081	.0059	
115,392	800	.0101	.0074	
129,816	900	.0120	.0091	
144,240	1,000	.0145	.0108	E=1,216,000.
158,664	1,100	.0172	.0130	
163,000	....	....	....	First crack.
173,088	1,200	.0205	.0155	
187,512	1,300	.0237	.0178	
201,936	1,400	.0269	.0205	
216,360	1,500	.0314	.0238	
230,784	1,600	.0364	.0279	
253,800	1,760	....	....	Ultimate strength.

No. 9699.

Marks, 10*a*.
Composition: Genesee cement, 1; sand, 5; broken stone, 14.70.
Consistency of mortar, dry.
Age, 1 year 6 months 21 days.
Set in mold 23 hours, in cool cellar 1 year 5 months 26 days, in air 25 days.
Weight per cubic foot, 139.23 pounds.
Sectional area, 143.64 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,364	100	0.	0.	Initial load.
28,728	200	.0008	.0004	
43,092	300	.0014	.0010	
57,456	400	.0026	.0016	
71,820	500	.0038	.0024	
86,184	600	.0054	.0034	E=1,250,000.
100,548	700	.0068	.0043	
114,912	800	.0085	.0056	
129,276	900	.0103	.0071	
143,640	1,000	.0117	.0079	E=1,184,000.
158,004	1,100	.0135	.0091	
172,368	1,200	.0156	.0105	
186,732	1,300	.0173	.0116	
200,000	....	....	....	First crack.
201,096	1,400	.0191	.0129	
215,460	1,500	.0203	.0135	
229,824	1,600	.0211	.0136	
254,900	1,775	....	....	Ultimate strength.

No. 9702.

Marks, 15.
Composition: Genesee cement, 1; sand, 5; broken stone, 15.
Consistency of mortar, plastic.
Age, 1 year 9 months 3 days.
Set in mold 74 hours, in water 4 months 12 days; buried in sand 1 year 1 month 10 days, in air 3 months 9 days.
Weight per cubic foot, 142.12 pounds.
Sectional area, 144.48 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,448	100	0.	0.	Initial load.
28,896	200	.0012	.0009	
43,344	300	.0026	.0019	
57,792	400	.0037	.0027	
72,240	500	.0048	.0035	
86,688	600	.0059	.0042	E=1,471,000.
101,136	700	.0071	.0051	
115,584	800	.0082	.0059	
130,032	900	.0096	.0069	
144,480	1,000	.0108	.0078	E=1,500,000.
158,928	1,100	.0122	.0088	
173,376	1,200	.0136	.0097	
187,824	1,300	.0151	.0108	First crack.
202,272	1,400	.0171	.0121	
216,720	1,500	.0187	.0134	
231,168	1,600	.0209	.0147	
245,616	1,700	.0232	.0165	
260,064	1,800	.0258	.0182	
274,512	1,900	.0287	.0210	
287,700	1,991	....	....	Ultimate strength.

No. 9706.

Marks, 11.
Composition: Genesee cement, 1; sand, 6; broken stone, 16.66.
Consistency of mortar, dry.
Age, 1 year 9 months 13 days.
Set in mold 29 hours, in water 4 months 15 days; buried in sand 1 year 1 month 10 days, in air, 3 months 18 days.
Weight per cubic foot, 139.24 pounds.
Sectional area, 144.36 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,436	100	0.	0.	Initial load.
28,872	200	.0011	.0007	
43,308	300	.0031	.0021	
57,744	400	.0052	.0038	
86,616	600	.0104	.0081	E=1,087,000.
115,488	800	.0170	.0135	
142,000	....	....	....	First crack.
144,360	1,000	.0249	.0204	
173,232	1,200	.0349	.0281	
197,100	1,365	....	....	Ultimate strength.

No. 9710.

Marks, 25.
Composition: Genesee cement, 1; sand, 1; broken stone, 4.16.
Consistency of mortar, excess.
Age, 1 year 9 months 10 days.
Set in mold 40 hours, in water 4 months 8 days; buried in sand 1 year 1 month 10 days, in air 3 months 21 days.
Weight per cubic foot, 146.45 pounds.
Sectional area, 146.40 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,640	100	0.	0.	Initial load.
29,280	200	.0001	0.	
43,920	300	.0004	0.	
58,560	400	.0007	0.	
87,840	600	.0015	.0001	E=1,786,000.
117,120	800	.0023	.0005	
146,400	1,000	.0033	.0008	E=1,800,609.
175,680	1,200	.0046	.0013	
204,960	1,400	.0062	.0021	E=1,163,000.
234,240	1,600	.0085	.0035	
263,520	1,800	.0103	.0044	
292,800	2,000	.0128	.0060	
322,080	2,200	.0152	.0073	
351,360	2,400	.0178	.0088	
380,640	2,600	.0201	.0102	
401,000	....	....	....	First crack.
409,920	2,800	.0227	.0120	
439,200	3,000	.0254	.0135	
468,480	3,200	.0284	.0152	
539,400	3,684	....	....	Ultimate strength.

No. 9711.

Marks, 25*a*.
Composition: Genesee cement, 1; sand, 1; broken stone, 4.16.
Consistency of mortar, excess.
Age, 1 year 6 months 16 days.
Set in mold 40 hours, in cool cellar 1 year 5 months 17 days; in air 28 days.
Weight per cubic foot, 143.46 pounds.
Sectional area, 143.76 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,376	100	0.	0.	Initial load.
28,752	200	.0005	.0001	
43,128	300	.0010	.0003	
57,504	400	.0015	.0006	
71,880	500	.0021	.0009	
86,256	600	.0029	.0012	E = 1,471,000.
100,632	700	.0038	.0015	
115,008	800	.0047	.0020	
129,384	900	.0059	.0028	
143,760	1,000	.0071	.0034	E = 1,216,000.
158,136	1,100	.0086	.0042	
172,512	1,200	.0100	.0051	
186,888	1,300	.0120	.0065	
200,000	....	....	....	First crack.
201,264	1,400	.0138	.0077	
215,640	1,500	.0155	.0089	
230,016	1,600	.0179	.0105	
244,392	1,700	.0199	.0118	
258,768	1,800	.0219	.0133	
273,144	1,900	.0242	.0150	
287,520	2,000	.0263	.0165	
301,896	2,100	.0285	.0188	
316,272	2,200	.0311	.0211	
427,800	2,976	....	....	Ultimate strength.

No. 9714.

Marks, 4.
Composition: Genesee cement, 1; sand, 2; broken stone, 6.17.
Consistency of mortar, dry.
Age, 1 year 9 months 3 days.
Set in mold 29 hours, in water 4 months 18 days; buried in sand 1 year 1 month 10 days, in air 3 months 5 days.
Weight per cubic foot, 144.14 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	.0002	0.	
43,236	300	.0006	0.	
57,648	400	.0008	.0001	
86,472	600	.0014	.0002	E=2,083,000.
115,296	800	.0022	.0006	
144,120	1,000	.0030	.0008	E=2,405,000.
172,944	1,200	.0040	.0012	
201,768	1,400	.0051	.0017	E=1,429,000.
230,592	1,600	.0063	.0022	
259,416	1,800	.0077	.0028	
288,240	2,000	.0094	.0037	
317,064	2,200	.0110	.0046	
345,888	2,400	.0130	.0060	First crack.
374,712	2,600	.0153	.0077	
403,536	2,800	.0172	.0086	
432,360	3,000	.0189	.0099	
461,184	3,200	.0216	.0118	
490,008	3,400	.0260	.0144	
515,200	3,575	....	....	Ultimate strength.

No. 9718.

Marks, 19.
Composition: Genesee cement, 1; sand, 2; broken stone, 6.43.
Consistency of mortar, dry.
Age, 1 year 9 months 5 days.
Set in mold 55 hours, in water 4 months 10 days; buried in sand 1 year 1 month 10 days, in air 3 months 14 days.
Weight per cubic foot, 142.62 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	.0002	0.	
43,236	300	.0006	.0001	
57,648	400	.0010	.0002	
86,472	600	.0018	.0005	E=1,923,000.
115,296	800	.0028	.0010	
144,120	1,000	.0039	.0014	E=1,800,000.
172,944	1,200	.0052	.0021	
201,768	1,400	.0066	.0028	E=1,282,000.
230,592	1,600	.0083	.0036	
259,416	1,800	.0101	.0045	
288,240	2,000	.0124	.0060	
317,064	2,200	.0144	.0074	
335,888	2,400	.0171	.0088	First crack.
374,712	2,600	.0202	.0110	
403,536	2,800	.0241	.0138	
432,360	3,000	.0295	.0178	
486,000	3,372	....	....	Ulimate strength.

No. 9722.

Marks, 22.
Composition: Genesee cement, 1; sand, 2; broken stone, 5.62.
Consistency of mortar, plastic.
Age, 1 year 9 months 9 days.
Set in mold 39 hours, in water 4 months 9 days; buried in sand 1 year 1 month 10 days, in air 3 months 19 days.
Weight per cubic foot, 144.57 pounds.
Sectional area, 145.08 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,508	100	0.	0.	Initial load.
29,016	200	0.	0.	
43,524	300	.0002	0.	
58,032	400	.0004	0.	
87,048	600	.0009	.0001	E=3,125,000.
116,064	800	.0014	.0003	
145,080	1,000	.0022	.0006	E=2,812,000.
174,096	1,200	.0030	.0009	
203,112	1,400	.0040	.0012	E=1,667,000.
232,128	1,600	.0049	.0017	
261,144	1,800	.0062	.0023	
290,160	2,000	.0076	.0030	
319,176	2,200	.0092	.0040	
348,192	2,400	.0110	.0050	
375,000	....	....	....	First crack.
377,208	2,600	.0130	.0062	
406,224	2,800	.0155	.0079	
435,240	3,000	.0185	.0096	
464,256	3,200	.0227	.0124	
493,272	3,400	....	....	Ultimate strength.

No. 9726.

Marks, 26.
Composition: Genesee cement, 1; sand, 2; broken stone, 6.82.
Consistency of mortar, excess.
Age, 1 year 8 months 20 days.
Set in mold 47 hours, in water 4 months 7 days; buried in sand 1 year 1 month 10 days, in air 3 months 1 day.
Weight per cubic foot, 144.60 pounds.
Sectional area, 144.36 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 436	100	0.	0.	Initial load.
28, 872	200	.0003	.0001	
43, 308	300	.0007	.0002	
57, 744	400	.0011	.0003	
72, 180	500	.0015	.0005	
86, 616	600	.0022	.0009	E=1,923,000.
101, 052	700	.0033	.0016	
115, 488	800	.0040	.0020	
129, 924	900	.0048	.0025	
144, 360	1, 000	.0059	.0032	E=1,667,000.
158, 796	1, 100	.0074	.0041	
173, 232	1, 200	.0088	.0050	
187, 668	1, 300	.0103	.0060	
202, 104	1, 400	.0117	.0072	
216, 540	1, 500	.0135	.0084	
230, 976	1, 600	.0153	.0097	
245, 512	1, 700	.0172	.0110	
259, 848	1, 800	.0188	.0120	First crack.
274, 284	1, 900	.0204	.0130	
288, 720	2, 000	.0224	.0145	
303, 156	2, 100	.0250	.0166	
317, 592	2, 200	.0276	.0183	
332, 028	2, 300	.0305	.0206	
394, 000	2, 729	....	....	Ultimate strength.

No. 9730.

Marks, 5.
Composition: Genesee cement, 1; sand, 3; broken stone, 8.12.
Consistency of mortar, dry.
Age, 1 year 9 months 26 days.
Set in mold 27 hours, in water 4 months 18 days; buried in sand 1 year 1 month 10 days, in air 3 months 28 days.
Weight per cubic foot, 144.32 pounds.
Sectional area, 143.64 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,364	100	0.	0.	Initial load.
28,728	200	.0002	.0001	
43,092	300	.0005	.0002	
57,456	400	.0008	.0003	
86,184	600	.0017	.0007	E = 2,500,000.
114,912	800	.0030	.0014	
143,640	1,000	.0045	.0022	E = 1,956,000.
172,368	1,200	.0067	.0036	
201,096	1,400	.0092	.0052	
229,824	1,600	.0121	.0074	
258,552	1,800	.0152	.0097	First crack.
287,280	2,000	.0191	.0124	
316,008	2,200	.0228	.0152	
344,736	2,400	.0274	.0189	
373,464	2,600	.0343	.0246	
402,192	2,800	.0428	.0317	
411,400	2,864	....	....	Ultimate strength.

No. 9734.

Marks, 20.
Composition: Genesee cement, 1; sand, 3; broken stone, 7.50.
Consistency of mortar, dry.
Age, 1 year 9 months 19 days.
Set in mold 49 hours, in water 4 months 10 days; buried in sand 1 year 1 month 10 days, in air 3 months 28 days.
Weight per cubic foot, 143.21 pounds.
Sectional area, 143.88 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,388	100	0.	0.	Initial load.
28,776	200	.0002	0.	
43,164	300	.0007	.0002	
57,552	400	.0013	.0004	
86,328	600	.0028	.0013	E = 1,667,000.
115,104	800	.0046	.0025	
143,880	1,000	.0070	.0040	E = 1,500,000.
172,656	1,200	.0096	.0061	
201,432	1,400	.0122	.0081	
230,208	1,600	.0155	.0103	First crack.
258,984	1,800	.0187	.0129	
287,760	2,000	.0228	.0158	
316,536	2,200	.0270	.0185	
345,312	2,400	.0320	.0220	
374,088	2,600	....	....	Ultimate strength.

No. 9738.

Marks, 23.
Composition: Genesee cement, 1; sand, 3; broken stone, 8.03.
Consistency of mortar, plastic.
Age, 1 year 7 months 21 days.
Set in mold 21 hours, in water 4 months 9 days; buried in sand 1 year 1 month 10 days, in air 2 months 1 day.
Weight per cubic foot, 146 pounds.
Sectional area, 144.48 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,448	100	0.	0.	Initial load.
28,896	200	.0003	.0001	
43,344	300	.0009	.0004	
57,792	400	.0015	.0007	
72,240	500	.0022	.0012	
86,688	600	.0036	.0016	E=1,250,000.
101,136	700	.0040	.0022	
115,584	800	.0048	.0028	
130,032	900	.0060	.0035	
144,480	1,000	.0071	.0041	E=1,500,000.
158,928	1,100	.0081	.0049	
173,376	1,200	.0094	.0059	
187,824	1,300	.0104	.0066	
202,272	1,400	.0118	.0077	First crack.
216,720	1,500	.0133	.0087	
231,168	1,600	.0147	.0091	
245,616	1,700	.0159	.0105	
348,000	2,409	....	....	Ultimate strength.

No. 9742.

Marks, 27.
Composition: Genesee cement, 1; sand, 3; broken stone, 8.80.
Consistency of mortar, excess.
Age, 1 year 9 months 16 days.
Set in mold 45 hours, in water 4 months 7 days; buried in sand 1 year 1 month 10 days, in air 3 months 28 days.
Weight per cubic foot, 142.07 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	.0005	.0002	
43,380	300	.0010	.0005	
57,840	400	.0016	.0008	
86,760	600	.0033	.0017	E=1,562,000.
115,680	800	.0053	.0030	
144,600	1,000	.0079	.0046	E=1,364,000.
173,520	1,200	.0106	.0071	
202,440	1,400	.0140	.0088	
231,360	1,600	.0171	.0110	
260,280	1,800	.0214	.0142	First crack.
289,200	2,000	.0265	.0175	
318,120	2,200	.0333	.0221	
346,500	2,396	....	....	Ultimate strength.

No. 9746.

Marks, 21.
Composition: Genesee cement, 1; sand, 4; broken stone, 10.97.
Consistency of mortar, dry.
Age, 1 year 9 months 13 days.
Set in mold 45 hours, in water 4 months 9 days; buried in sand 1 year 1 month 10 days, in air 3 months 23 days.
Weight per cubic foot, 141.98 pounds.
Sectional area, 143.40 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 340	100	0.	0.	Initial load.
28, 680	200	.0004	.0001	
43, 020	300	.0011	.0006	
57, 360	400	.0019	.0011	
86, 040	600	.0039	.0025	E = 1,786,000.
114, 720	800	.0069	.0044	
143, 400	1, 000	.0100	.0071	E = 1,552,000.
172, 080	1, 200	.0140	.0100	
200, 760	1, 400	.0187	.0137	First crack.
229, 440	1, 600	.0239	.0177	
258, 120	1, 800	.0301	.0224	
282, 000	1, 967	.0379	....	Ultimate strength.

No. 9750.

Marks, 24.
Composition: Genesee cement, 1; sand, 4; broken stone, 10.90.
Consistency of mortar, plastic.
Age, 1 year 9 months 18 days.
Set in mold 42 hours, in water 4 months 8 days; buried in sand 1 year 1 month 10 days, in air 3 months 29 days.
Weight per cubic foot, 141.23 pounds.
Sectional area, 144.36 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds	*Pounds.*	*Inch.*	*Inch.*	
14, 436	100	0.	0.	Initial load.
28, 872	200	.0003	.0001	
43, 308	300	.0007	.0002	
57, 744	400	.0012	.0004	
86, 616	600	.0023	.0011	E = 2,083,000.
115, 488	800	.0040	.0019	
144, 360	1, 000	.0060	.0033	E = 1,667,000.
173, 232	1, 200	.0081	.0046	
202, 104	1, 400	.0102	.0063	
230, 976	1, 600	.0126	.0079	First crack.
259, 848	1, 800	.0151	.0098	
288, 720	2, 000	.0163	.0097	
299, 800	2, 077	....	....	Ultimate strength.

No. 9754.

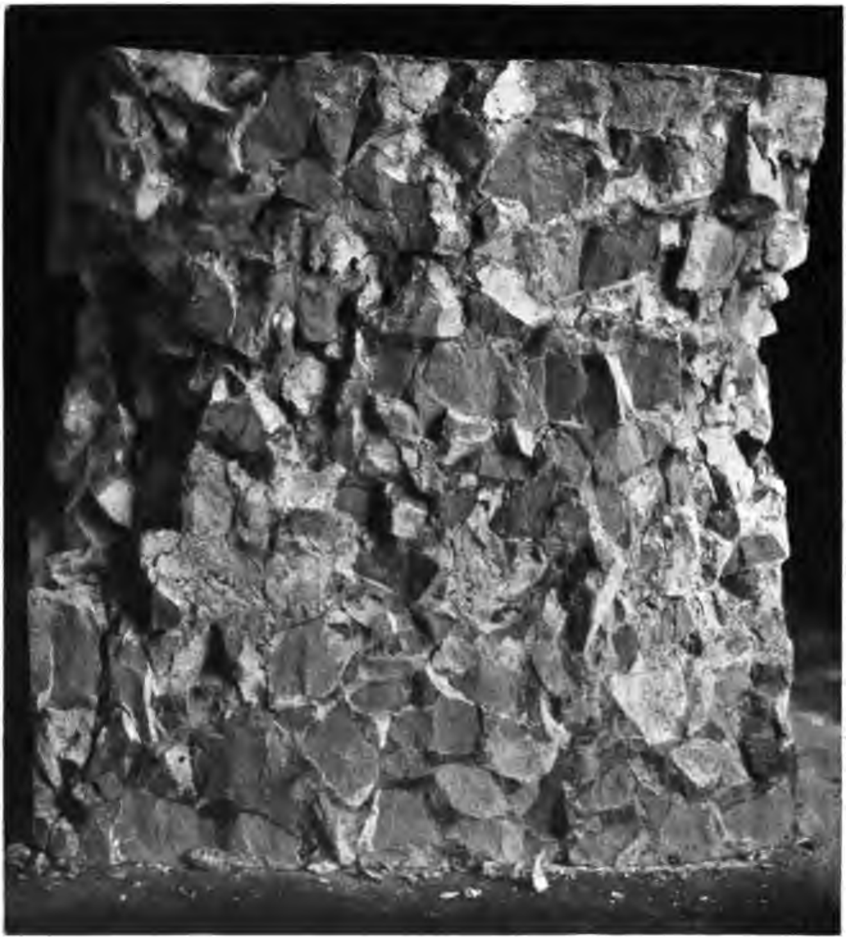
Marks, 6.
Composition: Genesee cement, 1; sand, 4; broken stone, 10.63.
Consistency of mortar, excess.
Age, 1 year 9 months 5 days.
Set in mold 23 hours, in water 4 months 18 days; buried in sand 1 year 1 month 10 days, in air 3 months 7 days.
Weight per cubic foot, 141.12 pounds.
Sectional area, 143.88 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,388	100	0.	0.	Initial load.
28,776	200	.0004	.0001	
43,164	300	.0010	.0003	
57,552	400	.0016	.0007	
71,940	500	.0023	.0011	
86,328	600	.0030	.0015	E = 1,667,000.
100,716	700	.0039	.0022	
115,104	800	.0052	.0030	
129,492	900	.0063	.0042	
143,880	1,000	.0079	.0043	E = 1,452,000.
158,268	1,100	.0096	.0060	
172,656	1,200	.0113	.0075	
187,044	1,300	.0131	.0087	
201,432	1,400	.0150	.0103	
215,820	1,500	.0180	.0126	
230,208	1,600	.0201	.0143	First crack.
244,596	1,700	.0226	.0161	
258,984	1,800	.0255	.0182	
273,372	1,900	.0280	.0200	
287,760	2,000	.0303	.0218	
345,600	2,402	....	....	Ultimate strength.

No. 9758.

Marks, 28.
Composition: Genesee cement, 1; sand, 4; broken stone, 10.40.
Consistency of mortar, excess.
Age, 1 year 9 months 8 days.
Set in mold 69 hours, in water 4 months 5 days; buried in sand 1 year 1 month 10 days, in air 3 months 21 days.
Weight per cubic foot, 141.05 pounds.
Sectional area, 145.20 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,520	100	0.	0.	Initial load.
29,040	200	.0002	.0001	
43,560	300	.0006	.0003	
58,080	400	.0014	.0007	
87,120	600	.0035	.0020	E = 1,667,000.
116,160	800	.0060	.0035	
145,200	1,000	.0099	.0065	E = 1,324,000.
174,240	1,200	.0145	.0101	
203,280	1,400	.0210	.0153	First crack.
232,320	1,600	.0328	.0252	
261,360	1,800	.0428	.0327	
280,400	1,931	.0590	....	Ultimate strength.



PHOTOGRAPH OF CONCRETE CUBE NO. 29, AFTER THE TEST.

No. 9762.

Marks, 29.
Composition: Wayland cement, 1; sand, 1; broken stone, 4.50.
Consistency of mortar, dry.
Age, 1 year 8 months 23 days.
Set in mold 65 hours, in water 4 months 5 days; buried in sand 1 year 1 month 10 days, in air 3 months 5 days.
Weight per cubic foot, 148.27 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	.0002	0.	
43,380	300	.0004	0.	
57,840	400	.0007	.0001	
86,760	600	.0013	.0002	E = 2,273,000.
115,680	800	.0019	.0004	
144,600	1,000	.0027	.0006	E = 2,143,000.
173,520	1,200	.0037	.0009	
202,440	1,400	.0047	.0012	E = 1,136,000.
231,360	1,600	.0061	.0016	
260,280	1,800	.0076	.0020	
289,200	2,000	.0095	.0030	
318,120	2,200	.0113	.0039	
347,040	2,400	.0135	.0050	
375,960	2,600	.0152	.0062	
404,880	2,800	.0167	.0072	First crack.
433,800	3,000	.0173	.0077	Micrometer disturbed.
462,720	3,200	.0177	.0081	
491,640	3,400	.0207	.0090	
520,560	3,600	.0222	.0097	
549,480	3,800	.0239	.0106	
578,400	4,000	.0260	.0116	
607,320	4,200	.0280	.0120	
636,240	4,400	.0343	.0141	
648,000	4,481	....	....	Ultimate strength.

No. 9766.

Marks, 34.
Composition: Wayland cement, 1; sand, 1; broken stone, 6.50.
Consistency of mortar, plastic.
Age, 1 year 8 months 30 days.
Set in mold 47 hours, in water 4 months 3 days; buried in sand 1 year 1 month 10 days, in air 3 months 15 days.
Weight per cubic foot, 148.89 pounds.
Sectional area, 144.36 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,436	100	0.	0.	Initial load.
28,872	200	.0003	.0001	
43,308	300	.0007	.0001	
57,744	400	.0011	.0002	
86,616	600	.0019	.0004	E=1,667,000.
115,488	800	.0027	.0008	
144,360	1,000	.0038	.0012	E=1,731,000.
173,232	1,200	.0049	.0016	
202,104	1,400	.0062	.0022	E=1,087,000.
230,976	1,600	.0079	.0029	
259,848	1,800	.0099	.0038	
288,720	2,000	.0124	.0052	
317,592	2,200	.0153	.0068	
346,464	2,400	.0178	.0084	
375,336	2,600	.0210	.0104	First crack.
404,208	2,800	.0240	.0124	
433,080	3,000	.0269	.0143	
461,952	3,200	.0298	.0162	
490,824	3,400	.0333	.0186	
519,696	3,600	.0364	.0203	
548,568	3,800	.0398	.0228	
577,440	4,000	.0435	.0252	
651,000	4,510	....	....	Ultimate strength.

No. 9770.

Marks, 39.
Composition: Wayland cement, 1; sand, 1; broken stone, 5.23.
Consistency of mortar, excess.
Age, 1 year 8 months 29 days.
Set in mold 23 hours, in water 4 months 2 days; buried in sand 1 year 1 month 10 days, in air 3 months 16 days.
Weight per cubic foot, 146.43 pounds.
Sectional area, 145.32 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,532	100	0.	0.	Initial load.
29,064	200	.0002	0.	
43,596	300	.0006	.0001	
58,128	400	.0009	.0002	
87,192	600	.0017	.0003	E=1,786,000.
116,256	800	.0025	.0007	
145,320	1,000	.0037	.0012	E=1,800,000.
174,384	1,200	.0050	.0017	
203,448	1,400	.0064	.0024	E=1,087,000.
232,512	1,600	.0086	.0035	
261,576	1,800	.0109	.0047	
290,640	2,000	.0132	.0061	
319,704	2,200	.0157	.0077	
348,768	2,400	.0185	.0094	First crack.
377,832	2,600	.0213	.0112	
406,896	2,800	.0242	.0133	
435,960	3,000	.0272	.0155	
465,024	3,200	.0308	.0182	
494,088	3,400	.0338	.0214	
618,000	4,253	....	....	Ultimate strength.

No. 9771.

Marks, 39*a*.
Composition: Wayland cement, 1; sand, 1; broken stone, 5.23.
Consistency of mortar, excess.
Age, 1 year 6 months 9 days.
Set in mold 23 hours, in cool cellar 1 year 5 months 11 days, in air 27 days.
Weight per cubic foot, 144.49 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	.0004	.0001	
43,236	300	.0009	.0003	
57,648	400	.0014	.0006	
72,060	500	.0020	.0008	
86,472	600	.0027	.0011	E=1,562,000.
100,884	700	.0035	.0014	
115,296	800	.0043	.0017	
129,708	900	.0053	.0023	
144,120	1,000	.0062	.0028	E=1,324,000.
158,532	1,100	.0075	.0035	
172,944	1,200	.0085	.0041	
187,356	1,300	.0098	.0049	
201,000	....	....	....	First crack.
201,768	1,400	.0109	.0056	
216,180	1,500	.0120	.0063	
230,592	1,600	.0135	.0076	
245,004	1,700	.0145	.0083	
259,416	1,800	.0155	.0088	
273,828	1,900	.0168	.0097	
288,240	2,000	.0183	.0109	
302,652	2,100	.0196	.0117	
317,064	2,200	.0212	.0130	
331,476	2,300	.0231	.0144	
345,888	2,400	.0247	.0155	
360,300	2,500	.0268	.0172	
374,712	2,600	.0289	.0187	
492,500	3,417	....	....	Ultimate strength.

No. 9774.

Marks, 30.
Composition: Wayland cement, 1; sand, 2; broken stone, 6.62.
Consistency of mortar, dry.
Age, 1 year 8 months 25 days.
Set in mold 63 hours, in water 4 months 5 days; buried in sand 1 year 1 month 10 days, in air 3 months 7 days.
Weight per cubic foot, 146.06 pounds.
Sectional area, 144.72 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,472	100	0.	0.	Initial load.
28,944	200	.0002	0.	
43,416	300	.0005	.0001	
57,888	400	.0009	.0001	
86,832	600	.0016	.0004	E=2,083,000.
115,776	800	.0025	.0008	
144,720	1,000	.0035	.0012	E=1,956,000.
173,664	1,200	.0050	.0019	
202,608	1,400	.0066	.0027	E=1,136,000.
231,552	1,600	.0089	.0040	
260,496	1,800	.0117	.0058	
289,440	2,000	.0146	.0079	
318,384	2,200	.0176	.0097	First crack.
347,328	2,400	.0203	.0114	
376,272	2,600	.0230	.0130	
405,216	2,800	.0257	.0147	
434,160	3,000	.0289	.0165	
487,400	3,368	....	....	Ultimate strength.

No. 9778.

Marks, 35.
Composition: Wayland cement, 1; sand, 2; broken stone, 7.39.
Consistency of mortar, plastic.
Age, 1 year 8 months 30 days.
Set in mold 45 hours, in water 4 months 3 days; buried in sand 1 year 1 month 10 days, in air 3 months 15 days.
Weight per cubic foot, 146.07 pounds.
Sectional area, 144 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,400	100	0.	0.	Initial load.
28,800	200	.0001	0.	
43,200	300	.0004	0.	
57,600	400	.0006	0.	
86,400	600	.0011	.0002	E=2,778,000.
115,200	800	.0019	.0005	
144,000	1,000	.0029	.0009	E=2,250,000.
172,800	1,200	.0042	.0015	
201,600	1,400	.0057	.0024	E=1,429,000.
230,400	1,600	.0074	.0033	
259,200	1,800	.0093	.0045	
288,000	2,000	.0117	.0062	
316,800	2,200	.0143	.0080	
345,600	2,400	.0173	.0101	First crack.
374,400	2,600	.0202	.0121	
403,200	2,800	.0230	.0140	
432,000	3,000	.0258	.0161	
451,000	3,132	....	....	Ultimate strength.

No. 9782.

Marks, 40.
Composition: Wayland cement, 1; sand, 2; broken stone, 6.23.
Consistency of mortar, excess.
Age, 1 year 8 months 27 days.
Set in mold 21 hours, in water 4 months 2 days; buried in sand 1 year 1 month 10 days, in air 3 months 14 days.
Weight per cubic foot, 145.19 pounds.
Sectional area, 144 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,400	100	0.	0.	Initial load.
28,800	200	.0002	0.	
43,200	300	.0005	.0001	
57,600	400	.0009	.0002	
86,400	600	.0017	.0005	E = 2,083,000.
115,200	800	.0026	.0009	
144,000	1,000	.0039	.0014	E = 1,800,000.
172,800	1,200	.0054	.0022	
201,600	1,400	.0076	.0035	
230,400	1,600	.0103	.0049	
259,200	1,800	.0132	.0068	
288,000	2,000	.0162	.0087	First crack.
316,800	2,200	.0207	.0119	
345,600	2,400	.0244	.0146	
374,400	2,600	.0286	.0173	
455,600	3,164	....	....	Ultimate strength.

No. 9786.

Marks, 31.
Composition: Wayland cement, 1; sand, 3; broken stone, 9.38.
Consistency of mortar, dry.
Age, 1 year 9 months 1 day.
Set in mold 69 hours, in water 4 months 4 days; buried in sand 1 year 1 month 10 days, in air 3 months 15 days.
Weight per cubic foot, 140.20 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	.0002	0.	
43,380	300	.0005	.0001	
57,840	400	.0008	.0002	
86,760	600	.0017	.0007	E = 3,500,000.
115,680	800	.0028	.0013	
144,600	1,000	.0043	.0021	E = 2,045,000.
173,520	1,200	.0062	.0033	
202,440	1,400	.0086	.0049	
231,360	1,600	.0114	.0067	First crack.
260,280	1,800	.0152	.0096	
289,200	2,000	.0202	.0138	
306,000	2,116	.0330	....	Ultimate strength.

No. 9790.

Marks, 36.
Composition: Wayland cement, 1; sand, 3; broken stone, 9.57.
Consistency of mortar, plastic.
Age, 1 year 8 months 19 days.
Set in mold 27 hours, in water 4 months 3 days; buried in sand 1 year 1 month 10 days, in air 3 months 5 days.
Weight per cubic foot, 145.22 pounds.
Sectional area, 144.36 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,436	100	0.	0.	Initial load.
28,872	200	.0002	.0001	
43,308	300	.0006	.0002	
57,744	400	.0010	.0004	
72,180	500	.0015	.0006	
86,616	600	.0020	.0008	E=2,083,000.
101,052	700	.0028	.0012	
115,488	800	.0035	.0015	
129,924	900	.0044	.0021	
144,360	1,000	.0053	.0026	E=1,667,000.
158,796	1,100	.0064	.0033	
173,232	1,200	.0074	.0039	
187,668	1,300	.0086	.0048	
202,104	1,400	.0098	.0057	
216,540	1,500	.0108	.0063	
230,976	1,600	.0123	.0077	
245,412	1,700	.0147	.0086	
259,848	1,800	.0150	.0097	First crack.
274,284	1,900	.0159	.0102	
288,720	2,000	.0171	.0110	
303,156	2,100	.0181	.0118	
317,592	2,200	.0199	.0130	
332,028	2,300	.0218	.0145	
346,464	2,400	.0238	.0157	
360,900	2,500	.0250	.0166	
375,336	2,600	.0267	.0174	
389,772	2,700	.0293	.0189	
401,500	2,781	....	....	Ultimate strength.

No. 9794.

Marks, 41.
Composition: Wayland cement, 1; sand, 3; broken stone, 9.37.
Consistency of mortar, excess.
Age, 1 year 8 months 26 days.
Set in mold 29 hours, in water 4 months 1 day; buried in sand 1 year 1 month 10 days, in air 3 months 14 days.
Weight per cubic foot, 143.38 pounds.
Sectional area, 144.36 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 436	100	0.	0.	Initial load.
28, 872	200	.0004	.0001	
43, 308	300	.0011	.0005	
57, 744	400	.0020	.0010	
86, 616	600	.0039	.0022	E = 1,471,000.
115, 488	800	.0065	.0043	
144, 360	1, 000	.0096	.0065	E = 1,452,000.
173, 232	1, 200	.0131	.0092	
202, 104	1, 400	.0155	.0110	First crack.
230, 976	1, 600	.0183	.0128	
259. 848	1, 800	.0215	.0147	
288, 720	2, 000	.0234	.0153	
294, 100	2, 037	....	....	Ultimate strength.

No. 9798.

Marks, 32.
Composition: Wayland cement, 1; sand, 4; broken stone, 12.86.
Consistency of mortar, dry.
Age, 1 year 9 months 4 days.
Set in mold 65 hours, in water 4 months 4 days; buried in sand 1 year 1 month 10 days, in air 3 months 18 days.
Weight per cubic foot, 143 pounds.
Sectional area, 144.72 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 472	100	0.	0.	Initial load.
28, 944	200	.0004	.0002	
43, 416	300	.0010	.0005	
57. 838	400	.0018	.0013	
86, 832	600	.0039	.0024	E = 1,667,000.
115, 776	800	.0070	.0045	
144, 720	1, 000	.0113	.0080	E = 1,364,000.
173, 664	1, 200	.0158	.0112	
202, 608	1, 400	.0210	.0152	First crack.
231, 552	1, 600	.0281	.0205	
200, 496	1, 800	.0363	.0262	
271, 000	1, 873	....	....	Ultimate strength.

No. 9802.

Marks, 37.
Composition: Wayland cement, 1; sand, 4; broken stone, 12.80.
Consistency of mortar, plastic.
Age, 1 year 7 months 15 days.
Set in mold 41 hours, in water 4 months 2 days; buried in sand 1 year 1 month 10 days, in air 2 months 1 day.
Weight per cubic foot, 144.32 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,400	100	0.	0.	Initial load.
28,920	200	.0005	.0003	
43,380	300	.0014	.0009	
57,840	400	.0033	.0022	
72,300	500	.0051	.0036	
86,700	600	.0075	.0055	E=1,250,000.
101,220	700	.0095	.0072	
115,680	800	.0118	.0091	
130,140	900	.0146	.0111	
144,000	....	....	....	First crack.
144,600	1,000	.0172	.0134	
159,060	1,100	.0204	.0157	
173,520	1,200	.0245	.0189	
187,980	1,300	.0278	.0216	
202,440	1,400	.0314	.0245	
254,600	1,761	....	....	Ultimate strength.

No. 9806.

Marks, 42.
Composition: Wayland cement, 1; sand, 4; broken stone, 12.71.
Consistency of mortar, excess.
Age, 1 year 9 months 10 days.
Set in mold 25 hours, in water 4 months 1 day; buried in sand 1 year 1 month 10 days, in air 3 months 28 days.
Weight per cubic foot, 142.82 pounds.
Sectional area, 145.20 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,520	100	0.	0.	Initial load.
29,040	200	.0002	.0001	
43,560	300	.0007	.0003	
58,080	400	.0015	.0008	
87,120	600	.0035	.0020	E=1,677,000.
116,160	800	.0064	.0040	
145,200	1,000	.0100	.0070	E=1,500,000.
174,240	1,200	.0137	.0097	First crack.
203,280	1,400	.0168	.0119	
232,320	1,600	.0208	.0149	
261,360	1,800	.0217	.0143	
278,300	1,917	.0196	....	Ultimate strength.

No. 9810.

Marks, 33.
Composition: Wayland cement, 1; sand, 5; broken stone, 15.44.
Consistency of mortar, dry.
Age, 1 year 9 months 12 days.
Set in mold 21 hours, in water 4 months 4 days; buried in sand 1 year 1 month 10 days, in air 3 months 28 days.
Weight per cubic foot, 142.22 pounds.
Sectional area, 144.24 square inches.
Gauged length, 5''.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	.0007	.0004	
43,272	300	.0016	.0011	
57,696	400	.0026	.0017	
86,544	600	.0055	.0038	E=1,471,000.
115,392	800	.0084	.0060	
144,240	1,000	.0110	.0080	E=1,500,000.
173,088	1,200	.0145	.0106	First crack.
201,936	1,400	.0175	.0125	
230,784	1,600	.0214	.0150	
259,632	1,800	.0255	.0177	
282,600	1,959	.0317	....	Ultimate strength.

No. 9814.

Marks, 38.
Composition: Wayland cement, 1; sand, 5; broken stone, 15.
Consistency of mortar, plastic.
Age, 1 year 7 months 26 days.
Set in mold 38 hours, in water 4 months 2 days; buried in sand 1 year 1 month 10 days, in air 2 months 12 days.
Weight per cubic foot, 142.84 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5''.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	.0006	.0004	
43,236	300	.0019	.0014	
57,648	400	.0036	.0027	
72,060	500	.0056	.0042	
86,472	600	.0081	.0065	E=1,562,000.
100,884	700	.0102	.0080	
115,296	800	.0135	.0106	
129,708	900	.0179	.0143	
144.120	1,000	.0200	.0157	E=1,016,000.
158,000	....	....	....	First crack.
158,532	1,100	.0233	.0181	
172,944	1,200	.0273	.0214	
187,356	1,300	.0317	.0248	
201,768	1,400	.0374	.0290	
216,180	1,500	.0424	.0328	
246,500	1,710	....	....	Ultimate strength.

No. 9818.

Marks, 43.
Composition: Wayland cement, 1; sand, 5; broken stone, 15.20.
Consistency of mortar, excess.
Age, 1 year 8 months 24 days.
Set in mold 23 hours, in water 4 months 1 day; buried in sand 1 year 1 month 10 days, in air 3 months 12 days.
Weight per cubic foot, 141.15 pounds.
Sectional area, 144.72 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,472	100	0.	0.	Initial load.
28,944	200	.0004	0.	
43,416	300	.0020	.0018	
57,888	400	.0039	.0030	
86,832	600	.0078	.0058	E=1,250,000.
115,776	800	.0125	.0096	
144,720	1,000	.0176	.0136	First crack.
173,664	1,200	.0230	.0173	
202,608	1,400	.0311	.0229	
212,700	1,470	....	....	Ultimate strength.

No. 9822.

Marks, 44.
Composition: Wayland cement, 1; sand, 1; broken stone, 5.11.
Consistency of mortar, dry.
Age, 1 year 8 months 16 days.
Set in mold 23 hours, in water 4 months; buried in sand 1 year 1 month 10 days, in air 3 months 5 days.
Weight per cubic foot, 148.15 pounds.
Sectional area, 144.24 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	.0001	0.	
43,272	300	.0003	0.	
57,696	400	.0005	0.	
86,544	600	.0010	.0001	E=2,778,000.
115,392	800	.0016	.0002	
144,240	1,000	.0024	.0004	} E=2,250,000.
173,088	1,200	.0035	.0008	
201,936	1,400	.0048	.0013	} E=1,087,000.
230,784	1,600	.0067	.0020	
259,632	1,800	.0088	.0030	
288,480	2,000	.0108	.0042	
317,328	2,200	.0130	.0055	
346,176	2,400	.0147	.0067	
375,024	2,600	.0163	.0077	
403,872	2,800	.0181	.0087	
432,720	3,000	.0205	.0100	First crack.
461,568	3,200	.0228	.0116	
470,416	3,400	.0241	.0123	
613,400	4,252	....	....	Ultimate strength.

No. 9826.

Marks, 49.
Composition: Wayland cement, 1; sand, 1; broken stone, 4.12.
Consistency of mortar, plastic.
Age, 1 year 9 months 3 days.
Set in mold 45 hours, in water 3 months 28 days; buried in sand 1 year 1 month 10 days, in air 3 months 23 days.
Weight per cubic foot, 147.54 pounds.
Sectional area, 144.00 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 400	100	0.	0.	Initial load.
28, 800	200	.0000	0.	
43, 200	300	.0000	0.	
57, 600	400	.0001	0.	
86, 400	600	.0006	0.	E = 4,167,000.
115, 200	800	.0012	.0001	
144, 000	1, 000	.0020	.0002	E = 2,500,000.
172, 800	1, 200	.0029	.0004	
201, 600	1, 400	.0039	.0007	E = 1,219,000.
230, 400	1, 600	.0051	.0011	
259, 200	1, 800	.0065	.0016	
288, 000	2, 000	.0083	.0024	
316, 800	2, 200	.0104	.0034	
345, 600	2, 400	.0124	.0043	
374, 400	2, 600	.0146	.0056	
403, 200	2, 800	.0170	.0068	First crack.
432, 000	3, 000	.0189	.0081	
460, 800	3, 200	.0211	.0094	
489, 600	3, 400	.0236	.0111	
518, 400	3, 600	.0256	.0121	
642, 600	4, 462	....	....	Ultimate strength.

No. 9830.

Marks, 54.
Composition: Wayland cement, 1; sand, 1; broken stone, 4.37.
Consistency of mortar, excess.
Age, 1 year 8 months 21 days.
Set in mold 39 hours, in water 3 months 25 days; buried in sand 1 year 1 month 10 days, in air 3 months 14 days.
Weight per cubic foot, 146.82 pounds.
Sectional area, 144.00 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,400	100	0.	0.	Initial load.
28,800	200	.0002	0.	
43,200	300	.0035	.0001	
57,600	400	.0009	.0001	
86,400	600	.0015	.0004	E=2,273,000.
115,200	800	.0022	.0006	
144,000	1,000	.0031	.0009	E=2,045,000.
172,800	1,200	.0044	.0013	
201,600	1,400	.0058	.0019	
230,400	1,600	.0076	.0027	E=1,111,000.
259,200	1,800	.0097	.0040	
288,000	2,000	.0119	.0052	
316,800	2,200	.0139	.0074	First crack.
345,600	2,400	.0186	.0102	
374,400	2,600	.0202	.0122	
403,200	2,800	.0248	.0146	
432,000	3,000	.0300	.0181	
460,800	3,200	.0397	.0249	
486,600	3,379	.0495	....	Ultimate strength.

No. 9834.

Marks, 45.
Composition: Wayland cement, 1; sand, 2; broken stone, 7.62.
Consistency of mortar, dry.
Age, 1 year 8 months 16 days.
Set in mold 19 hours, in water 4 months; buried in sand 1 year 1 month 10 days, in air 3 months 5 days.
Weight per cubic foot, 145.22 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	.0002	0.	
43,380	300	.0006	.0001	
57,840	400	.0009	.0002	
86,760	600	.0017	.0005	E = 2,083,000.
115,680	800	.0026	.0008	
144,600	1,000	.0036	.0012	E = 1,875,000.
173,520	1,200	.0050	.0017	
202,440	1,400	.0068	.0027	E = 1,111,000.
231,360	1,600	.0091	.0039	
260,280	1,800	.0108	.0048	
289,200	2,000	.0135	.0066	
318,120	2,200	.0157	.0081	
347,040	2,400	.0180	.0095	First crack.
375,960	2,600	.0207	.0111	
404,880	2,800	.0234	.0128	
483,800	3,000	.0255	.0140	
448,260	3,100	.0266	.0144	
462,720	3,200	.0272	.0146	
477,180	3,300	.0278	.0146	
538,000	3,686	....	....	Ultimate strength.

No. 9838.

Marks, 50.
Composition: Wayland cement, 1; sand, 2; broken stone, 6.43.
Consistency of mortar, plastic.
Age, 1 year 8 months 20 days.
Set in mold 18 hours, in water 3 months 27 days; buried in sand 1 year 1 month 10 days, in air 3 months 12 days.
Weight per cubic foot, 143.48 pounds.
Sectional area, 144.24 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 424	100	0.	0.	Initial load.
28, 848	200	.0001	0.	
43, 272	300	.0004	0.	
57, 696	400	.0007	.0001	
86, 544	600	.0013	.0002	E = 2,273,000.
115, 392	800	.0021	.0006	
144, 240	1, 000	.0031	.0010	E = 2,143,000.
173, 088	1, 200	.0042	.0015	
201, 936	1, 400	.0054	.0022	E = 1,562,000.
230, 784	1, 600	.0069	.0031	
259, 632	1, 800	.0085	.0040	
288, 480	2, 000	.0102	.0049	
317, 328	3. 200	.0119	.0059	
346, 176	2, 400	.0130	.0070	First crack.
375, 024	2. 600	.0140	.0078	
403, 872	2 800	.0153	.0090	
432, 720	3, 000	.0179	.0113	
461, 568	3, 200	.0217	.0141	
484, 500	3, 359	....	....	Ultimate strength.

No. 9842.

Marks, 55.
Composition: Wayland cement, 1; sand, 2; broken stone, 6.43.
Consistency of mortar, excess.
Age, 1 year 8 months 27 days.
Set in mold 21 hours, in water 3 months 25 days; buried in sand 1 year 1 month 10 days, in air 3 months 21 days.
Weight per cubic foot, 145.36 pounds.
Sectional area, 144.00 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 400	100	0.	0.	Initial load.
28, 800	200	.0001	0.	
43, 200	300	.0003	0.	
57, 600	400	.0006	0.	
86, 400	600	.0013	.0003	E = 2,500,000.
115, 200	800	.0024	.0008	
144, 000	1, 000	.0037	.0014	E = 1,956,000.
172. 800	1, 200	.0053	.0021	
201, 600	1, 400	.0076	.0033	
230, 400	1, 600	.0100	.0046	
255. 000	....	....	....	First crack.
259, 200	1, 800	.0124	.0061	
288, 000	2, 000	.0150	.0080	
316, 800	2, 200	.0177	.0095	
345, 600	2, 400	.0198	.0112	
374, 400	2, 600	.0214	.0123	
403, 200	2, 800	.0248	.0150	
432, 000	3, 000	.0286	.0177	
460, 800	3, 200	.0336	.0213	
482, 600	3, 351	.0440	....	Ultimate strength.

No. 9846.

Marks, 46.
Composition: Wayland cement, 1; sand, 3; broken stone, 8.18.
Consistency of mortar, dry.
Age, 1 year 8 months 23 days.
Set in mold 16 hours, in water 4 months; buried in sand 1 year 1 month 10 days, in air 3 months 12 days.
Weight per cubic foot, 141.05 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 460	100	0.	0.	Initial load.
28, 920	200	.0003	.0001	
43, 380	300	.0007	.0002	
57, 840	400	.0011	.0004	
86, 760	600	.0022	.0010	E = 2,083,000.
115, 680	800	.0038	.0020	
144, 600	1, 000	.0056	.0031	E = 1,800,000.
173, 520	1, 200	.0083	.0049	
202, 440	1, 400	.0117	.0074	
231, 360	1, 600	.0154	.0102	
260, 280	1, 800	.0203	.0139	First crack.
289, 200	2, 000	.0266	.0190	
328, 500	2, 272	....	....	Ultimate strength.

No. 9850.

Marks, 51.
Composition: Wayland cement, 1; sand, 3; broken stone, 8.29.
Consistency of mortar, plastic.
Age, 1 year 8 months 17 days.
Set in mold 15 hours, in water 3 months 27 days; buried in sand 1 year 1 month 10 days, in air 3 months 9 days.
Weight per cubic foot, 141.73 pounds.
Sectional area, 144.72 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 472	100	0.	0.	Initial load.
28, 944	200	.0008	.0001	
43, 416	300	.0009	.0003	
57, 888	400	.0016	.0008	
72, 360	500	.0024	.0013	
86, 832	600	.0033	.0019	E = 1,786,000.
101, 304	700	.0045	.0028	
115, 776	800	.0058	.0037	
130, 248	900	.0072	.0046	
144, 720	1, 000	.0088	.0058	E = 1,500,000.
159, 192	1, 100	.0110	.0076	
173, 664	1, 200	.0130	.0090	
188, 136	1, 300	.0155	.0108	
202, 608	1, 400	.0179	.0127	
217, 080	1, 500	.0215	.0157	
231, 552	1, 600	.0244	.0180	First crack.
246, 024	1, 700	.0276	.0203	
260, 496	1, 800	.0314	.0236	
274, 968	1, 900	.0364	.0274	
289, 440	2, 000	.0424	.0320	
303, 912	2, 100	.0494	.0382	
322, 800	2, 230	....	....	Ultimate strength.

No. 9854.

Marks, 56.
Composition: Wayland cement, 1; sand, 3; broken stone, 8.34.
Consistency of mortar, excess.
Age, 1 year 8 months 18 days.
Set in mold 48 hours, in water 3 months 24 days; buried in sand 1 year 1 month 10 days, in air 2 months 12 days.
Weight per cubic foot, 142.92 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 412	100	0.	0.	Initial load.
28, 824	200	.0003	.0001	
43, 236	300	.0009	.0003	
57, 648	400	.0014	.0007	
72, 060	500	.0021	.0011	
86, 472	600	.0030	.0015	E = 1,667,000.
100, 884	700	.0041	.0028	
115, 296	800	.0056	.0033	
129, 708	900	.0071	.0042	
144, 120	1, 000	.0087	.0054	E = 1,364,000.
158, 532	1, 100	.0107	.0070	
170, 000	....	....	....	First crack.
172, 944	1, 200	.0126	.0085	
187, 356	1, 300	.0146	.0098	
201, 768	1, 400	.0168	.0115	
216, 180	1, 500	.0189	.0130	
230, 592	1, 600	.0208	.0143	
245, 004	1, 700	.0229	.0159	
259, 416	1, 800	.0252	.0174	
273, 828	1, 900	.0280	.0193	
288, 240	2, 000	.0315	.0214	
302, 652	2, 100	.0365	.0243	
315, 200	2, 187	....	....	Ultimate strength.

No. 9858.

Marks, 47.
Composition: Wayland cement, 1; sand, 4; broken stone, 10.71.
Consistency of mortar, dry.
Age, 1 year 8 months 22 days.
Set in mold 51 hours, in water 3 months 28 days; buried in sand 1 year 1 month 10 days, in air 3 months 12 days.
Weight per cubic foot, 140.52 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 460	100	0.	0.	Initial load.
28, 920	200	.0006	.0003	
43, 380	300	.0014	.0007	
57, 840	400	.0024	.0013	
86, 760	600	.0045	.0026	E = 1, 316, 000
115, 680	800	.0068	.0041	
144, 600	1, 000	.0095	.0057	E = 1, 184, 000
173, 520	1, 200	.0128	.0083	
202, 440	1, 400	.0170	.0111	First crack.
231, 360	1, 600	.0217	.0145	
260, 280	1, 800	.0237	....	
271, 800	1, 880	....	....	Ultimate strength.

No. 9862.

Marks, 52.
Composition: Wayland cement, 1; sand, 4; broken stone, 10.97.
Consistency of mortar, plastic.
Age, 1 year 8 months 22 days.
Set in mold 29 hours, in water 3 months 26 days; buried in sand 1 year 1 month 10 days, in air 3 months 15 days.
Weight per cubic foot, 140.88 pounds.
Sectional area, 144.96 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,496	100	0.	0.	Initial load.
28,992	200	.0008	.0004	
43,488	300	.0018	.0012	
57,984	400	.0032	.0022	
86,976	600	.0064	.0047	E = 1,471,000.
115,968	800	.0101	.0073	
144,960	1,000	.0144	.0106	E = 1,184,000.
173,952	1,200	.0196	.0145	
190,000	....	....	....	First crack.
202,944	1,400	.0257	.0194	
231,936	1,600	.0338	.0264	
258,200	1,781	....	....	Ultimate strength.

No. 9866.

Marks, 57.
Composition: Wayland cement, 1; sand, 4; broken stone, 10.97.
Consistency of mortar, excess.
Age, 1 year 8 months 24 days.
Set in mold 45 hours, in water 3 months 24 days; buried in sand 1 year 1 month 10 days, in air 3 months 18 days.
Weight per cubic foot, 142.18 pounds.
Sectional area, 144.96 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,496	100	.0	0.	Initial load.
28,992	200	.0005	.0003	
43,488	300	.0014	.0009	
57,984	400	.0021	.0013	
86,976	600	.0049	.0033	E = 1,562,000.
115,968	800	.0086	.0060	
144,960	1,000	.0128	.0093	E = 1,286,000.
173,952	1,200	.0169	.0124	
202,944	1,400	.0212	.0155	First crack.
231,936	1,600	.0272	.0200	
260,928	1,800	.0322	.0225	
271,000	1,869	....	....	Ultimate strength.

No. 9870.

Marks, 48.
Composition: Wayland cement, 1; sand, 5; broken stone, 11.25.
Consistency of mortar, dry.
Age, 1 year 8 months 22 days.
Set in mold 47 hours, in water 3 months 28 days; buried in sand 1 year 1 month 10 days, in air 3 months 12 days.
Weight per cubic foot, 141.36 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	.0005	.0002	
43,236	300	.0014	.0008	
57,648	400	.0025	.0015	
86,472	600	.0057	.0039	E=1,380,000.
115,296	800	.0098	.0069	
144,120	1,000	.0137	.0098	E=1,154,000.
172,944	1,200	.0200	.0147	
201,768	1,400	.0282	.0212	First crack.
264,000	1,832	....	....	Ultimate strength.

No. 9874.

Marks, 53.
Composition: Wayland cement, 1; sand, 5; broken stone, 12.50.
Consistency of mortar, plastic.
Age, 1 year 9 months 5 days.
Set in mold 24 hours, in water 3 months 26 days; buried in sand 1 year 1 month 10 days, in air 3 months 28 days.
Weight per cubic foot, 139.60 pounds.
Sectional area, 144,84 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,484	100	0.	0.	Initial load.
28,968	200	.0007	.0004	
43,452	300	.0016	.0011	
57,936	400	.0028	.0018	
86,904	600	.0062	.0042	E=1,250,000.
115,872	800	.0100	.0072	First crack.
144,840	1,000	.0147	.0106	
173,808	1,200	.0198	.0147	
202,776	1,400	.0260	.0191	
231,744	1,600	.0346	.0245	
236,200	1,631	.0357	....	Ultimate strength.

No. 9878.

Marks, 58.
Composition: Wayland cement, 1; sand, 5; broken stone, 12.90.
Consistency of mortar, excess.
Age, 1 year 8 months 23 days.
Set in mold 27 hours, in water 3 months 24 days; buried in sand 1 year 1 month 10 days, in air 3 months 18 days.
Weight per cubic foot, 141.76 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	.0009	.0006	
43,236	300	.0021	.0015	
57,648	400	.0039	.0028	
86,472	600	.0082	.0063	E = 1,316,000.
115,296	800	.0133	.0103	
144,120	1,000	.0191	.0148	E = 1,046,000.
169,000	....	....	....	First crack.
172,944	1,200	.0267	.0208	
201,768	1,400	.0367	.0289	
230,592	1,600	.0471	.0380	
245,700	1,705	.0524	....	Ultimate strength.

No. 9882.

Marks, 59.
Composition: Ironclad cement, 1; sand, 2; broken stone, 8.04.
Consistency of mortar, dry.
Age, 1 year 8 months 28 days.
Set in mold 48 hours, in water 3 months 23 days; buried in sand 1 year 1 month 10 days, in air 3 months 23 days.
Weight per cubic foot, 145.60 pounds.
Sectional area, 144.48 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,448	100	0.	0.	Initial load.
28,896	200	.0001	0.	
43,344	300	.0004	.0001	
57,792	400	.0007	.0001	
86,688	600	.0013	.0003	E = 2,500,000.
115,584	800	.0021	.0006	
144,480	1,000	.0029	.0010	E = 2,368,000.
173,376	1,200	.0041	.0016	
202,272	1,400	.0058	.0024	E = 1,282,000.
231,168	1,600	.0077	.0035	
260,064	1,800	.0102	.0053	
288,960	2,000	.0124	.0066	
317,856	2,200	.0151	.0085	
346,752	2,400	.0183	.0107	
375,648	2,600	.0230	.0142	First crack.
404,544	2,800	.0265	.0163	
433,440	3,000	.0326	.0207	
462,336	3,200	.0430	.0324	
474,300	3,283	....	....	Ultimate strength.

No. 9886.

Marks, 62.
Composition: Ironclad cement, 1; sand, 2; broken stone, 7.76.
Consistency of mortar, plastic.
Age, 1 year 7 months 15 days.
Set in mold 24 hours, in water 3 months 23 days; buried in sand 1 year 1 month 10 days, in air 2 months 11 days.
Weight per cubic foot, 144.37 pounds.
Sectional area, 144.48 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 448	100	0.	0.	Initial load.
28, 896	200	.0001	0.	
43, 344	300	.0003	0.	
57, 792	400	.0005	.0001	
72, 240	500	.0009	.0002	
86, 688	600	.0012	.0003	E=2,778,000.
101, 136	700	.0014	.0004	
115, 584	800	.0018	.0006	
130, 032	900	.0023	.0008	
144, 480	1, 000	.0028	.0010	E=2,500,000.
158, 928	1, 100	.0036	.0012	
173, 376	1, 200	.0041	.0015	
187, 824	1, 300	.0052	.0020	
202, 272	1, 400	.0064	.0027	
216, 720	1, 500	.0077	.0035	
231, 168	1, 600	.0091	.0043	
245, 616	1, 700	.0105	.0053	
260, 064	1, 800	.0128	.0069	
270, 000	....	....	....	First crack.
274, 512	1, 900	.0145	.0081	
288, 960	2, 000	.0166	.0095	
303, 408	2, 100	.0191	.0114	
317, 856	2, 200	.0211	.0128	
332, 304	2, 300	.0240	.0148	
346, 752	2, 400	.0269	.0170	
861, 200	2, 500	.0309	.0200	
416, 300	2, 881	....	....	Ultimate strength.

No. 9887.

Marks, 62*a*.
Composition: Ironclad cement, 1; sand, 2; broken stone, 7.76.
Consistency of mortar, plastic.
Age, 1 year 5 months 29 days.
Set in mold 24 hours, in cool cellar 1 year 5 months 2 days, in air 26 days.
Weight per cubic foot, 142.07 pounds.
Sectional area, 144.48 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,448	100	0.	0.	Initial load.
28,896	200	.0002	0.	
43,344	300	.0005	.0001	
57,792	400	.0009	.0002	
72,240	500	.0016	.0005	
86,688	600	.0023	.0008	E = 1,667,000.
101,136	700	.0032	.0014	
115,584	800	.0043	.0022	
130,032	900	.0056	.0030	
144,480	1,000	.0068	.0038	E = 1,500,000.
158,928	1,100	.0081	.0046	
173,376	1,200	.0093	.0055	
187,824	1,300	.0106	.0063	
201,000	....	....	....	First crack.
202,272	1,400	.0120	.0073	
216,720	1,500	.0184	.0085	
14,448	100	....	.0083	After 2 minutes' rest.
28,896	200	.0088	....	
43,344	300	.0092	....	
57,792	400	.0097	....	
72,240	500	.0101	....	
86,688	600	.0105	....	
101,136	700	.0109	....	
115,584	800	.0112	....	
130,032	900	.0116	....	
144,480	1,000	.0119	....	
130,032	900	.0117	....	
115,584	800	.0115	....	
101,136	700	.0113	....	
86,688	600	.0111	....	
72,240	500	.0108	....	
57,792	400	.0104	....	
43,344	300	.0100	....	
28,896	200	.0094	....	
14,448	100	....	.0080	
14,448	100	....	.0085	After 5 minutes' rest.
231,168	1,600	.0147	.0094	
245,616	1,700	.0155	.0099	
260,064	1,800	.0163	.0103	
274,512	1,900	.0178	.0109	
288,960	2,000	.0191	.0117	
327,200	2,265	....	....	Ultimate strength.

No. 9890.

Marks, 65.
Composition: Ironclad cement, 1; sand, 2; broken stone, 7.25.
Consistency of mortar, excess.
Age, 1 year 9 months 1 day.
Set in mold 41 hours, in water 3 months 21 days; buried in sand 1 year 1 month 10 days, in air 3 months 28 days.
Weight per cubic foot, 144.58 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 412	100	0.	0.	Initial load.
28, 824	200	.0001	0.	
43, 236	300	.0002	0.	
57, 648	400	.0004	0.	
86, 472	600	.0009	.0001	E=3,125,000.
115, 296	800	.0015	.0004	
144, 120	1, 000	.0023	.0007	E=2,812,000.
172, 944	1, 200	.0038	.0015	
201, 768	1, 400	.0056	.0023	
230, 592	1, 600	.0078	.0037	
259, 416	1, 800	.0110	.0060	
288, 240	2, 000	.0151	.0089	First crack.
317, 064	2, 200	.0194	.0119	
345, 888	2, 400	.0247	.0161	
374, 712	2. 600	.0362	.0252	
403, 536	2, 800	.0480	.0348	
429, 400	2, 979	....	....	Ultimate strength.

No. 9894.

Marks, 60.
Composition: Ironclad cement, 1; sand, 3; broken stone, 9.78.
Consistency of mortar, dry.
Age, 1 year 8 months 23 days.
Set in mold 45 hours, in water 3 months 23 days; buried in sand 1 year 1 month 10 days, in air 3 months 18 days.
Weight per cubic foot, 143.31 pounds.
Sectional area, 145.32 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 532	100	0.	0.	Initial load.
29, 064	200	.0000	0.	
43, 596	300	.0004	.0001	
58, 128	400	.0012	.0005	
87, 192	600	.0036	.0021	E=1,667,000.
116, 256	800	.0073	.0049	
145, 320	1, 000	.0135	.0099	E=1,250,000.
174, 384	1, 200	.0207	.0158	
202, 000	....	....	....	First crack.
203, 448	1, 400	.0310	.0249	
270, 800	1, 863	....	....	Ultimate strength.

No. 9898.

Marks, 63.
Composition: Ironclad cement, 1; sand, 3; broken stone, 10.
Consistency of mortar, plastic.
Age, 1 year 8 months 23 days.
Set in mold 63 hours, in water 3 months 21 days; buried in sand 1 year 1 month 10 days, in air 3 months 19 days.
Weight per cubic foot, 143.31 pounds.
Sectional area, 145.68 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,568	100	0.	0.	Initial load.
29,136	200	.0001	0.	
43,704	300	.0003	0.	
58,272	400	.0008	.0001	
87,408	600	.0022	.0009	E=1,928,000.
116,544	800	.0051	.0026	
145,680	1,000	.0106	.0069	E=1,216,000.
172,000	....	....	....	First crack.
174,816	1,200	.0183	.0139	
203,952	1,400	.0320	.0250	
233,088	1,600	.0510	.0394	
291,500	2,001	....	....	Ultimate strength.

No. 9902.

Marks, 66.
Composition: Ironclad cement, 1; sand, 3; broken stone, 10.23.
Consistency of mortar, excess.
Age, 1 year 7 months 14 days.
Set in mold 6¾ hours, in water 3 months 20 days; buried in sand 1 year 1 month 10 days, in air 2 months 11 days.
Weight per cubic foot, 142.57 pounds.
Sectional area, 145.56 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,556	100	0.	0.	Initial load.
29,112	200	.0002	0.	
43,668	300	.0006	.0002	
58,224	400	.0012	.0006	
72,780	500	.0020	.0011	
87,336	600	.0033	.0018	E=1,667,000.
101,892	700	.0051	.0032	
116,448	800	.0071	.0045	
131,004	900	.0096	.0065	
145,560	1,000	.0126	.0089	E=1,216,000.
160,116	1,100	.0166	.0122	First crack.
174,672	1,200	.0210	.0159	
189,228	1,300	.0251	.0191	
203,784	1,400	.0305	.0235	
218,340	1,500	.0350	.0270	
14,556	100	....	.0260	After ½ minute.
29,112	200	.0274	....	
58,224	400	.0292	....	
87,336	600	.0308	....	
116,448	800	.0320	....	
145,560	1,000	.0331	....	
174,672	1,200	.0341	....	
203,784	1,400	.0356	....	
174,672	1,200	.0354	....	
145,500	1,000	.0349	....	
116,448	800	.0343	....	
87,336	600	.0336	....	
58,224	400	.0324	....	
29,112	200	.0305	.0284	
14,550	100	....	.0282	After ½ minute.
279,300	1,919	....	....	Ultimate strength.

No. 9906.

Marks, 61.
Composition: Ironclad cement, 1; sand, 4; broken stone, 12.85.
Consistency of mortar, dry.
Age, 1 year 8 months 23 days.
Set in mold 27 hours, in water 3 months 23 days; buried in sand 1 year 1 month 10 days, in air 3 months 19 days.
Weight per cubic foot, 142.33 pounds.
Sectional area, 145.80 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,580	100	0.	0.	Initial load.
29,160	200	.0013	.0010	
43,740	300	.0032	.0025	
58,320	400	.0051	.0041	
87,480	600	.0099	.0080	E=1,316,000.
116,640	800	.0157	.0128	
145,800	1,000	.0221	.0181	First crack.
174,960	1,200	.0282	.0231	
204,120	1,400	.0365	.0297	
232,200	1,593	....	....	Ultimate strength.

No. 9910.

Marks, 64.
Composition: Ironclad cement, 1; sand, 4; broken stone, 12.85.
Consistency of mortar, plastic.
Age, 1 year 8 months 24 days.
Set in mold 45 hours, in water 3 months 21 days; buried in sand 1 year 1 month 10 days, in air 3 months 21 days.
Weight per cubic foot, 141.53 pounds.
Sectional area, 144.48 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,448	100	0.	0.	Initial load.
28,896	200	.0006	.0004	
43,344	300	.0018	.0009	
57,792	400	.0025	.0016	
72,240	500	.0038	.0028	
86,688	600	.0056	.0040	E=1,562,000.
101,136	700	.0078	.0059	
115,584	800	.0100	.0075	
130,032	900	.0126	.0097	
144,480	1,000	.0160	.0123	E=1,216,000.
158,920	1,100	.0194	.0150	
173,376	1,200	.0225	.0174	
187,824	1,300	.0273	.0212	
202,272	1,400	.0318	.0248	
216,720	1,500	.0389	.0310	First crack.
231,168	1,600	.0473	.0379	
261,800	1,809	....	....	Ultimate strength.

No. 9914.

Marks, 67.
Composition: Ironclad cement, 1; sand, 4; broken stone, 15.
Consistency of mortar, excess.
Age, 1 year 8 months 25 days.
Set in mold 45 hours, in water 3 months 19 days; buried in sand 1 year 1 month 10 days, in air 3 months 24 days.
Weight per cubic foot, 144.89 pounds.
Sectional area, 145.20 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,520	100	0.	0.	Initial load.
29,040	200	.0005	.0002	
43,560	300	.0012	.0005	
58,080	400	.0020	.0014	
87,120	600	.0050	.0035	E=1,667,000.
116,160	800	.0090	.0066	
145,200	1,000	.0144	.0110	E=1,324,000.
172,000	....	....	....	First crack.
174,240	1,200	.0211	.0166	
203,280	1,400	.0302	.0244	
232,320	1,600	.0445	.0371	
267,300	1,841	....	....	Ultimate strength.

No. 9915.

Marks, 67*a*.
Composition: Ironclad cement, 1; sand, 4; broken stone, 15.
Consistency of mortar, excess.
Age, 1 year 5 months 26 days.
Set in mold 45 hours, in cool cellar 1 year 4 months 29 days, in air 26 days.
Weight per cubic foot, 139.69 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	.0010	.0006	
43,380	300	.0025	.0019	
57,840	400	.0048	.0037	
72,300	500	.0077	.0061	
86,760	600	.0111	.0088	E=1,087,000.
101,220	700	.0148	.0119	
115,680	800	.0188	.0152	First crack.
130,140	900	.0231	.0188	
144,600	1,000	.0278	.0228	
204,700	1,416	....	....	Ultimate strength.

No. 9918.

Marks, 68.
Composition: Ironclad cement, 1; sand, 2; broken stone, 6.25.
Consistency of mortar, dry.
Age, 1 year 9 months.
Set in mold 42 hours, in water 3 months 19 days; buried in sand 1 year 1 month 10 days, in air 3 months 29 days.
Weight per cubic foot, 145.09 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 460	100	0.	0.	Initial load.
28, 920	200	.0001	0.	
43, 380	300	.0002	0.	
57, 840	400	.0004	0.	
86, 760	600	.0008	0.	E=3,125,000.
115, 680	800	.0012	.0001	
144, 600	1, 000	.0017	.0002	E=3,000,000.
173, 520	1, 200	.0023	.0005	
202. 440	1, 400	.0030	.0007	E=2,000,000.
231, 360	1, 600	.0038	.0011	
260, 280	1, 800	.0046	.0013	
289, 200	2, 000	.0057	.0017	
318, 120	2, 200	.0066	.0021	
347, 040	2, 400	.0078	.0026	
375, 960	2, 600	.0090	.0032	
404, 880	2, 800	.0105	.0040	
433, 800	3, 000	.0124	.0050	First crack.
462, 720	3, 200	.0146	.0064	
491, 640	3, 400	.0170	.0078	
520, 560	3, 600	.0213	.0104	
549, 480	3, 800	.0270	.0141	
578, 400	4, 000	.0450	.0253	Ultimate strength.

No. 9922.

Marks, 71.
Composition: Ironclad cement, 1; sand, 2; broken stone, 6.71.
Consistency of mortar, plastic.
Age, 1 year 8 months 12 days.
Set in mold 45 hours, in water 3 months 18 days; buried in sand 1 year 1 month 10 days, in air 3 months 12 days.
Weight per cubic foot, 144.37 pounds.
Sectional area, 144.24 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	.0001	0.	
43,272	300	.0002	0.	
57,696	400	.0004	0.	
86,544	600	.0008	.0001	E = 3,571,000.
115,392	800	.0013	.0001	
144,240	1,000	.0018	.0003	E = 3,000,000. E = 2,000,000.
173,088	1,200	.0024	.0005	
201,936	1,400	.0031	.0007	
230,784	1,600	.0040	.0011	
259,632	1,800	.0048	.0014	
288,480	2,000	.0058	.0018	
317,328	2,200	.0068	.0022	
346,176	2,400	.0080	.0028	
375,024	2,600	.0091	.0033	
403,872	2,800	.0104	.0041	
432,720	3,000	.0121	.0048	First crack.
461,568	3,200	.0143	.0060	
490,416	3,400	.0174	.0078	
519,264	3,600	.0209	.0096	Ultimate strength.

No. 9926.

Marks, 74.
Composition: Ironclad cement, 1; sand, 2; broken stone, 6.51.
Consistency of mortar, excess.
Age, 1 year 8 months 14 days.
Set in mold 45 hours, in water 3 months 17 days; buried in sand 1 year 1 month 10 days, in air 3 months 15 days.
Weight per cubic foot, 145.24 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	.0000	0.	
43,380	300	.0001	0.	
57,840	400	.0003	0.	
86,760	600	.0008	0.	E = 3,125,000.
115,680	800	.0014	.0001	
144,600	1,000	.0020	.0004	E = 2,812,000.
173,520	1,200	.0029	.0007	
202,440	1,400	.0037	.0011	E = 1,471,000.
231,360	1,600	.0049	.0015	
260,280	1,800	.0062	.0021	
289,200	2,000	.0082	.0032	
318,120	2,200	.0107	.0046	
347,040	2,400	.0130	.0061	First crack.
375,960	2,600	.0166	.0083	
404,880	2,800	.0200	.0105	
433,800	3,000	.0249	.0139	
496,800	3,436	....	....	Ultimate strength.

No. 9930.

Marks, 69.
Composition: Ironclad cement, 1; sand, 3; broken stone, 8.32.
Consistency of mortar, dry.
Age, 1 year 8 months 17 days.
Set in mold 39 hours, in water 3 months 19 days; buried in sand 1 year 1 month 10 days, in air 3 months 16 day.
Weight per cubic foot, 141.31 pounds.
Sectional area, 144.24 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	.0002	0.	
43,272	300	.0007	.0001	
57,696	400	.0012	.0003	
86,544	600	.0022	.0010	E = 2,083,000.
115,392	800	.0038	.0018	
144,240	1,000	.0060	.0033	E = 1,667,000.
173,088	1,200	.0093	.0057	
201,936	1,400	.0133	.0091	
230,784	1,600	.0186	.0127	
259,632	1,800	.0258	.0189	First crack.
288,480	2,000	.0362	.0278	
313,000	2,170	....	....	Ultimate strength.

No. 9934.

Marks, 72.
Composition: Ironclad cement, 1; sand, 3; broken stone, 8.38.
Consistency of mortar, plastic.
Age, 1 year 8 months 14 days.
Set in mold 51 hours, in water 3 months 17 days; buried in sand 1 year 1 month and 10 days, in air 3 months 15 days.
Weight per cubic foot, 140.49 pounds.
Sectional area, 144.72 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,472	100	0.	0.	Initial load.
28,944	200	.0003	.0001	
43,416	300	.0008	.0003	
57,888	400	.0013	.0006	
86,832	600	.0026	.0013	E = 1,923,000.
115,776	800	.0043	.0025	
144,720	1,000	.0064	.0040	E = 1,875,000.
173,664	1,200	.0091	.0058	
202,608	1,400	.0118	.0077	
231,552	1,600	.0147	.0097	
245,000	....	....	....	First crack.
260,496	1,800	.0178	.0117	
289,440	2,000	.0215	.0145	
318,384	2,200	.0247	.0155	Ultimate strength.

After determining the set the specimen failed while reapplying the load, the highest load then reached being 310,000 pounds.

No. 9938.

Marks, 75.
Composition: Ironclad cement, 1; sand, 3; broken stone, 8.38.
Consistency of mortar, excess.
Age, 1 year 8 months 21 days.
Set in mold 51 hours, in water 3 months 16 days; buried in sand 1 year 1 month 10 days, in air 3 months 23 days.
Weight per cubic foot, 143.52 pounds.
Sectional area, 144.96 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,496	100	0.	0.	Initial load.
28,992	200	.0002	0.	
43,488	300	.0005	.0001	
57,984	400	.0010	.0003	
86,976	600	.0019	.0009	E = 2,500,000.
115,968	800	.0037	.0019	
144,960	1,000	.0061	.0035	E = 1,731,000.
173,952	1,200	.0088	.0054	
202,944	1,400	.0115	.0074	
231,936	1,600	.0149	.0099	
260,928	1,800	.0185	.0125	First crack.
289,920	2,000	.0230	.0160	
318,912	2,200	.0285	.0204	
347,904	2,400	.0381	.0283	
365,000	2,518	....	....	Ultimate strength.

No. 9942.

Marks, 70.
Composition: Ironclad cement, 1; sand, 4; broken stone, 10.46.
Consistency of mortar, dry.
Age, 1 year 8 months 18 days.
Set in mold 24 hours, in water 3 months 18 days; buried in sand 1 year 1 month 10 days, in air 3 months 18 days.
Weight per cubic foot, 142.58 pounds.
Sectional area, 146.05 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,605	100	0.	0.	Initial load.
29,210	200	.0002	0.	
43,815	300	.0007	.0002	
58,420	400	.0013	.0006	
87,630	600	.0030	.0017	E=1,923,000.
116,840	800	.0052	.0034	
146,050	1,000	.0080	.0053	E=1,667,000.
175,260	1,200	.0115	.0080	
203,000	....	....	....	First crack.
204,470	1,400	.0159	.0113	
262,890	1,800	.0279	.0210	
297,000	2,034	....	....	Ultimate strength.

No. 9946.

Marks, 73.
Composition: Ironclad cement, 1; sand, 4; broken stone, 11.25.
Consistency of mortar, plastic.
Age, 1 year 8 months 13 days.
Set in mold 47 hours, in water 3 months 17 days; buried in sand 1 year 1 month 10 days, in air 3 months 14 days.
Weight per cubic foot, 141.35 pounds.
Sectional area, 145.56 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,556	100	0.	0.	Initial load.
29,112	200	.0003	.0001	
43,668	300	.0007	.0002	
58,224	400	.0012	.0004	
87,336	600	.0026	.0012	E=1,786,000.
116,448	800	.0045	.0024	
145,560	1,000	.0075	.0044	E=1,452,000.
174,672	1,200	.0117	.0074	
203,784	1,400	.0172	.0115	First crack.
232,896	1,600	.0240	.0169	
269,800	1,854	....	....	Ultimate strength.

No. 9950.

Marks, 76.
Composition: Ironclad cement, 1; sand, 4; broken stone, 11.25.
Consistency of mortar, excess.
Age, 1 year 8 months 8 days.
Set in mold 47 hours, in water 3 months 16 days; buried in sand 1 year 1 month 10 days, in air 3 months 10 days.
Weight per cubic foot, 140.64 pounds.
Sectional area, 145.68 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 568	100	0.	0.	Initial load.
29, 136	200	.0005	.0001	
43, 704	300	.0012	.0007	
58, 272	400	.0022	.0013	
87, 408	600	.0048	.0033	E = 1,667,000.
116, 544	800	.0087	.0062	
145, 680	1, 000	.0135	.0100	E = 1,286,000.
174, 816	1, 200	.0205	.0157	
178, 000	....	....	....	First crack.
203, 952	1, 400	.0285	.0223	
255, 200	1, 752	....	....	Ultimate strength.

No. 9954.

Marks, 77.
Composition: Empire cement, 1; sand, 2; broken stone, 7.50.
Consistency of mortar, dry.
Age, 1 year 8 months 14 days.
Set in mold 45 hours, in water 3 months 16 days; buried in sand 1 year 1 month 10 days, in air 3 months 16 days.
Weight per cubic foot, 144.64 pounds.
Sectional area, 145.44 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 544	100	0.	0.	Initial load.
29, 088	200	.0003	.0001	
43, 632	300	.0006	.0002	
58, 176	400	.0009	.0003	
87, 264	600	.0013	.0004	E = 2,778,000
116, 352	800	.0020	.0006	
145, 440	1, 000	.0026	.0008	E = 2,500,000
174, 528	1, 200	.0033	.0010	
203, 616	1, 400	.0042	.0014	E = 1,724,000
232, 704	1, 600	.0051	.0018	
261, 792	1, 800	.0062	.0023	
290, 880	2, 000	.0072	.0025	
319, 968	2, 200	.0085	.0032	
349, 056	2, 400	.0097	.0037	
378, 144	2, 600	.0109	.0042	
407, 232	2, 800	.0127	.0050	
436, 320	3, 000	.0145	.0060	First crack.
465, 408	3, 200	.0168	.0072	
494, 496	3, 400	.0192	.0088	
523, 584	3, 600	.0220	.0105	
552, 672	3, 800	.0254	.0125	
581, 760	4, 000	.0300	.0150	
610, 500	4, 198	....	....	Ultimate strength.

No. 9958.

Marks, 80.
Composition: Empire cement, 1; sand, 2; broken stone, 6.71.
Consistency of mortar, plastic.
Age, 1 year 8 months 7 days.
Set in mold 69 hours, in water 3 months 14 days; buried in sand 1 year 1 month 10 days, in air 3 months 10 days.
Weight per cubic foot, 143.21 pounds.
Sectional area, 144.24 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	.0001	0.	
43,236	300	.0002	0.	
57,648	400	.0005	0.	
86,472	600	.0012	.0001	E = 2,273,000.
115,296	800	.0020	.0006	
144,120	1,000	.0031	.0012	E = 2,368,000.
172,944	1,200	.0043	.0019	
201,768	1,400	.0061	.0030	E = 1,351,000.
230,592	1,600	.0084	.0045	
259,416	1,800	.0110	.0062	
288,240	2,000	.0134	.0078	
317,064	2,200	.0172	.0104	
345,888	2,400	.0209	.0131	First crack.
374,712	2,600	.0260	.0170	
427,600	2,964	....	....	Ultimate strength.

No. 9962.

Marks, 83.
Composition: Empire cement, 1; sand, 2; broken stone, 7.50.
Consistency of mortar, excess.
Age, 1 year 8 months 5 days.
Set in mold 69 hours, in water 3 months 13 days; buried in sand 1 year 1 month 10 days, in air 3 months 9 days.
Weight per cubic foot, 145.37 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	.0000	0.	
43,380	300	.0001	0.	
57,840	400	.0003	0.	
86,760	600	.0008	.0001	E = 3,571,000.
115,680	800	.0014	.0002	
144,600	1,000	.0021	.0004	E = 2,647,000.
173,520	1,200	.0031	.0009	
202,440	1,400	.0043	.0014	E = 1,250,000.
231,360	1,600	.0062	.0024	
260,280	1,800	.0084	.0037	
289,200	2,000	.0115	.0058	
318,120	2,200	.0148	.0080	
347,040	2,400	.0177	.0099	
375,960	2,600	.0213	.0125	First crack.
404,880	2,800	.0246	.0146	
433,800	3,000	.0285	.0172	
462,720	3,200	.0340	.0210	
491,640	3,400	.0520	.0333	Ultimate strength.

No. 9966.

Marks, 78.
Composition: Empire cement, 1; sand, 3; broken stone, 9.78.
Consistency of mortar, dry.
Age, 1 year 8 months 21 days.
Set in mold 75 hours, in water 3 months 14 days; buried in sand 1 year 1 month 10 days, in air 3 months 24 days.
Weight per cubic foot, 142.21 pounds.
Sectional area, 145.08 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,508	100	0.	0.	Initial load.
29,016	200	0.	0.	
43,524	300	.0002	0.	
58,032	400	.0004	0.	
87,048	600	.0009	.0001	E = 3,125,000.
116,064	800	.0015	.0003	
145,080	1,000	.0025	.0009	E = 2,812,000.
174,096	1,200	.0035	.0012	
50,778	350	....	....	Rested under this load 16 hours.
14,508	100	....	.0014	
203,112	1,400	.0049	.0022	E = 1,282,000.
232,128	1,600	.0070	.0034	
261,144	1,800	.0095	.0050	
290,160	2,000	.0129	.0074	
319,176	2,200	.0183	.0116	First crack.
348,192	2,400	.0261	.0180	
377,208	2,600	.0372	.0266	
399,600	2,754	....	....	Ultimate strength.

No. 9970.

Marks, 81.
Composition: Empire cement, 1; sand, 3; broken stone, 10.23.
Consistency of mortar, plastic.
Age, 1 year 8 months 6 days.
Set in mold 75 hours, in water 3 months 13 days; buried in sand 1 year 1 month 10 days, in air 3 months 10 days.
Weight per cubic foot, 142.81 pounds.
Sectional area, 145.32 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,532	100	0.	0.	Initial load.
29,064	200	.0001	0.	
43,596	300	.0005	.0001	
58,128	400	.0009	.0003	
87,192	600	.0023	.0011	E = 2,083,000.
116,256	800	.0046	.0026	
145,320	1,000	.0082	.0051	E = 1,452,000.
174,384	1,200	.0121	.0082	
203,448	1,400	.0166	.0114	
232,512	1,600	.0215	.0152	First crack.
261,576	1,800	.0271	.0195	
290,640	2,000	.0344	.0250	
319,704	2,200	.0436	.0328	
344,800	2,373	....	....	Ultimate strength.

No. 9974.

Marks, 84.
Composition: Empire cement, 1; sand, 3; broken stone, 10.23.
Consistency of mortar, excess.
Age, 1 year 8 months 10 days.
Set in mold 69 hours, in water 3 months 11 days; buried in sand 1 year 1 month 10 days, in air 3 months 16 days.
Weight per cubic foot, 141.92 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	.0002	0.	
43,380	300	.0007	.0002	
57,840	400	.0013	.0004	
86,760	600	.0030	.0015	E = 1,667,000.
115,680	800	.0058	.0036	
144,600	1,000	.0098	.0066	E = 1,406,000.
173,520	1,200	.0144	.0102	
202,440	1,400	.0195	.0141	
212,000	....	....	....	First crack.
231,360	1,600	.0271	.0203	
260,280	1,800	.0351	.0272	
289,200	2,000	.0457	.0353	
326,000	2,254	....	....	Ultimate strength.

No. 9978.

Marks, 79.
Composition: Empire cement, 1; sand, 4; broken stone, 12.85.
Consistency of mortar, dry.
Age, 1 year 8 months 19 days.
Set in mold 71 hours, in water 3 months 14 days; buried in sand 1 year 1 month 10 days, in air 3 months 22 days.
Weight per cubic foot, 140.37 pounds.
Sectional area, 144.84 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,484	100	0.	0.	Initial load.
28,968	200	.0005	.0002	
43,452	300	.0011	.0006	
57,936	400	.0020	.0011	
86,904	600	.0040	.0026	E = 1,786,000.
115,872	800	.0070	.0045	
144,840	1,000	.0097	.0064	E = 1,364,000.
173,808	1,200	.0138	.0094	
202,776	1,400	.0195	.0140	First crack.
231,744	1,600	.0269	.0195	
260,712	1,800	.0329	.0322	
285,500	1,971	....	....	Ultimate strength.

No. 9982.

Marks, 82.
Composition: Empire cement, 1; sand, 4; broken stone, 13.24.
Consistency of mortar, plastic.
Age, 1 year 8 months 6 days.
Set in mold 71 hours, in water 3 months 13 days; buried in sand 1 year 1 month 10 days, in air 3 months 10 days.
Weight per cubic foot, 140.79 pounds.
Sectional area, 145.68 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 568	100	0.	0.	Initial load.
29, 136	200	.0008	.0005	
43. 704	300	.0019	.0012	
58, 272	400	.0029	.0020	
87, 408	600	.0059	.0041	E = 1,389,000.
116, 544	800	.0101	.0075	
145, 680	1, 000	.0146	.0108	E = 1,184,000.
174, 816	1, 200	.0207	.0159	First crack.
203, 952	1, 400	.0277	.0212	
233, 088	1, 600	.0357	.0276	
262, 224	1, 800	.0493	.0387	
270, 300	1, 855	....	....	Ultimate strength.

No. 9985.

Marks, 82*c*.
Composition: Empire cement, 1; sand, 4; broken stone, 13.24.
Consistency of mortar, plastic.
Age, 1 year 5 months 30 days.
Set in mold 71 days, in open air covered with sacking and wet with water several times a day for 2 months 16 days, then took weather as it came 1 year 3 months 23 days.
Weight per cubic foot, 141.59 pounds.
Sectional area, 146.17 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 617	100	0.	0.	Initial load.
29, 234	200	.0010	.0007	
43, 851	300	.0022	.0016	
58, 468	400	.0038	.0030	
73, 085	500	.0062	.0046	
87, 702	600	.0090	.0073	E = 1,471,000.
102, 319	700	.0125	.0100	
116, 936	800	.0156	.0124	
131, 553	900	.0191	.0153	First crack.
146, 170	1, 000	.0225	.0179	
160, 787	1, 100	.0250	.0195	
175, 404	1, 200	.0273	.0211	
190, 021	1, 300	.0263	.0190	Apparent compression nearly reached ″.0300, when the micrometer reversed its movement and returned to ″.0263.
204, 638	1, 400	.0273	.0177	
219, 255	1, 500	.0290	.0170	
223, 600	1, 530	....	....	Ultimate strength. Erratic movement of the micrometer during the final stages of the test attributed to local yielding of the concrete.

No. 9986.

Marks, 85.
Composition: Empire cement, 1; sand, 4; broken stone, 13.24.
Consistency of mortar, excess.
Age, 1 year 8 months 23 days.
Set in mold 65 hours, in water 3 months 11 days; buried in sand 1 year 1 month 10 days, in air 3 months 29 days.
Weight per cubic foot, 142.18 pounds.
Sectional area, 145.32 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,532	100	0.	0.	Initial load.
29,064	200	.0005	.0002	
43,596	300	.0012	.0006	
58,128	400	.0020	.0012	
87,192	600	.0045	.0031	E=1,786,000.
116,256	800	.0093	.0068	
145,320	1,000	.0148	.0112	E=1,250,000.
174,384	1,200	.0206	.0158	First crack.
203,448	1,400	.0266	.0202	
232,512	1,600	.0341	.0254	
252,800	1,740	.0338	....	Ultimate strength.

No. 9990.

Marks, 86.
Composition: Empire cement, 1; sand, 2; broken stone, 6.33.
Consistency of mortar, dry.
Age, 1 year 8 months 16 days.
Set in mold 63 hours, in water 3 months 11 days; buried in sand 1 year 1 month 10 days, in air 3 months 22 days.
Weight per cubic foot, 144.34 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	.0002	0.	
43,236	300	.0005	0.	
57,648	400	.0007	.0001	
86,472	600	.0012	.0003	E=2,778,000.
115,296	800	.0019	.0005	
144,120	1,000	.0024	.0007	E=2,647,000.
172,944	1,200	.0031	.0010	
201,768	1,400	.0040	.0013	E=2,273,000.
230,592	1,600	.0047	.0019	
259,416	1,800	.0056	.0022	
288,240	2,000	.0065	.0026	
144,120	1,000	....	....	Rested under this load 16 hours.
....	100	....	.0036	
317,064	2,200	.0080	.0038	
345,888	2,400	.0089	.0041	
374,712	2,600	.0101	.0046	
403,536	2,800	.0114	.0052	
432,360	3,000	.0132	.0062	
461,184	3,200	.0151	.0074	First crack.
490,008	3,400	.0178	.0090	
518,832	3,600	.0208	.0107	
547,656	3,800	.0255	.0142	
576,480	4,000	.0370	....	
588,500	4,083	....	....	Ultimate strength.

No. 9994.

Marks, 89.
Composition: Empire cement, 1; sand, 2; broken stone, 6.43.
Consistency of mortar, plastic.
Age, 1 year 8 months 15 days.
Set in mold 63 hours, in water 3 months 10 days; buried in sand 1 year 1 month 10 days, in air 3 months 22 days.
Weight per cubic foot, 144.62 pounds.
Sectional area, 144.96 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,496	100	0.	0.	
28,992	200	.0001	0.	
43,488	300	.0002	0.	
57,984	400	.0005	0.	
86,976	600	.0010	.0001	E = 2,778,000.
115,968	800	.0016	.0002	
144,960	1,000	.0022	.0005	E = 2,647,000.
173,952	1,200	.0030	.0008	
202,944	1,400	.0039	.0012	E = 1,613,000.
231,936	1,600	.0052	.0018	
260,928	1,800	.0063	.0024	
289,920	2,000	.0082	.0034	
318,912	2,200	.0102	.0042	
347,904	2,400	.0122	.0056	
376,896	2,600	.0155	.0080	
405,888	2,800	.0187	.0099	
406,000	....	....	....	First crack.
434,880	3,000	.0231	.0132	
463,872	3,200	.0285	.0174	
537,000	3,704	....	....	Ultimate strength.

No. 9998.

Marks, 92.
Composition: Empire cement, 1; sand, 2; broken stone, 6.43.
Consistency of mortar, excess.
Age, 1 year 8 months 16 days.
Set in mold 63 hours, in water 3 months 9 days; buried in sand 1 year 1 month 10 days, in air 3 months 24 days.
Weight per cubic foot, 144.29 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	.0002	0.	
43,236	300	.0005	.0001	
57,648	400	.0007	.0002	
86,472	600	.0013	.0003	E=2,500,000.
115,296	800	.0021	.0007	
144,120	1,000	.0033	.0011	E=2,045,000.
172,944	1,200	.0043	.0016	
201,768	1,400	.0060	.0024	E=1,163,000.
230,592	1,600	.0082	.0037	
259,416	1,800	.0112	.0057	
288,240	2,000	.0145	.0080	
317,064	2,200	.0175	.0099	
345,888	2,400	.0200	.0113	
374,712	2,600	.0231	.0131	
403,536	2,800	.0267	.0160	
425,200	2,950	.0490	....	Ultimate strength.

No. 10002.

Marks, 87.
Composition: Empire cement, 1; sand, 3; broken stone, 8.03.
Consistency of mortar, dry.
Age, 1 year 8 months 17 days.
Set in mold 69 hours, in water 3 months 10 days; buried in sand 1 year 1 month 10 days, in air 3 months 24 days.
Weight per cubic foot, 141.21 pounds.
Sectional area, 145.32 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,582	100	0.	0.	Initial load.
29,064	200	.0002	0.	
43,596	300	.0004	.0001	
58,128	400	.0006	.0001	
87,192	600	.0012	.0003	E=2,778,000.
116,256	800	.0019	.0006	
145,320	1,000	.0028	.0010	E=2,500,000.
174,384	1,200	.0038	.0014	
203,448	1,400	.0051	.0020	E=1,351,000.
232,512	1,600	.0067	.0028	
261,576	1,800	.0087	.0039	
290,640	2,000	.0115	.0060	
319,704	2,200	.0149	.0083	
346,768	2,400	.0207	.0127	
377,832	2,600	.0280	.0184	First crack.
406,896	2,800	.0380	.0263	
419,500	2,887	....	....	Ultimate strength.

No. 10006.

Marks, 90.
Composition: Empire cement, 1; sand, 3; broken stone, 8.33.
Consistency of mortar, plastic.
Age, 1 year 8 months 21 days.
Set in mold 69 hours, in water 3 months 12 days; buried in sand 1 year 1 month 10 days, in air 3 months 21 days.
Weight per cubic foot, 141.24 pounds.
Sectional area, 144.48 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,448	100	0.	0.	Initial load.
28,896	200	.0003	0.	
43,344	300	.0006	.0002	
57,792	400	.0010	.0004	
86,688	600	.0020	.0009	E=2,273,000.
115,584	800	.0033	.0017	
144,480	1,000	.0048	.0027	E=1,143,000.
173,376	1,200	.0074	.0044	
202.272	1,400	.0098	.0062	
228,000	....	....	....	First crack.
231,168	1,600	.0129	.0083	
260,064	1,800	.0163	.0108	
288,960	2,000	.0203	.0138	
317,856	2,200	.0243	.0168	
346,752	2,400	.0274	.0189	
372,500	2,578	....	....	Ultimate strength.

No. 10010.

Marks, 93.
Composition: Empire cement, 1; sand, 3; broken stone, 8.58.
Consistency of mortar, excess.
Age, 1 year 8 months 14 days.
Set in mold 93 hours, in water 3 months 7 days; buried in sand 1 year 1 month 10 days; in air 3 months 23 days.
Weight per cubic foot, 143.83 pounds.
Sectional area, 144.84 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,484	100	0.	0.	Initial load.
28,968	200	.0001	0.	
43,452	300	.0004	.0001	
57,936	400	.0006	.0002	
86,904	600	.0015	.0006	E = 2,778,000.
115,872	800	.0031	.0015	E = 1,875,000.
144,840	1,000	.0054	.0030	
173,808	1,200	.0080	.0048	
202,776	1,400	.0120	.0078	
231,744	1,600	.0159	.0106	
260,712	1,800	.0214	.0149	
275,000	....	....	....	First crack.
289,680	2,000	.0275	.0193	
314,500	2,171	.0375	....	Ultimate strength.

No. 10014.

Marks, 88.
Composition: Empire cement, 1; sand, 4; broken stone, 10.71.
Consistency of mortar, dry.
Age, 1 year 8 months 14 days.
Set in mold 65 hours, in water 3 months 10 days; buried in sand 1 year 1 month 10 days, in air 3 months 21 days.
Weight per cubic foot, 139.57 pounds.
Sectional area, 144.72 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,472	100	0.	0.	Initial load.
28,944	200	.0001	0.	
43,416	300	.0004	0.	
57,888	400	.0007	.0001	
86,832	600	.0015	.0005	E = 2,500,000.
115,776	800	.0025	.0009	E = 2,045,000.
144,720	1,000	.0036	.0014	
173,664	1,200	.0057	.0026	
202,608	1,400	.0084	.0044	
231,552	1,600	.0121	.0074	
260,496	1,800	.0192	.0129	
285,000	....	....	....	First crack.
289,440	2,000	.0300	.0220	
300,100	2,074	.0570	....	Ultimate strength.

No. 10018.

Marks, 91.
Composition: Empire cement, 1; sand, 4; broken stone, 10.71.
Consistency of mortar, plastic.
Age, 1 year 8 months 20 days.
Set in mold 66 hours, in water 3 months 9 days; buried in sand 1 year 1 month 10 days, in air 3 months 28 days.
Weight per cubic foot, 141.08 pounds.
Sectional area, 144.48 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,448	100	0.	0.	Initial load.
28,896	200	.0002	0.	
43,344	300	.0005	.0002	
57,792	400	.0010	.0005	
86,688	600	.0025	.0014	E=2,273,000.
115,584	800	.0045	.0028	
144,480	1,000	.0080	.0052	E=1,607,000.
173,376	1,200	.0118	.0082	
202,272	1,400	.0156	.0110	First crack.
231,168	1,600	.0209	.0153	
260,064	1,800	.0289	.0215	
288,960	2,000	.0400	....	Ultimate strength.

No. 10022.

Marks, 94.
Composition: Empire cement, 1; sand, 4; broken stone, 10.97.
Consistency of mortar, excess.
Age, 1 year 8 months 14 days.
Set in mold 89 hours, in water 3 months 7 days; buried in sand 1 year 1 month 10 days, in air 3 months 23 days.
Weight per cubic foot, 139.20 pounds.
Sectional area, 145.32 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,532	100	0.	0.	Initial load.
29,064	200	.0005	.0002	
43,596	300	.0013	.0009	
58,128	400	.0024	.0016	
87,192	600	.0060	.0043	E=1,471,000.
116,256	800	.0108	.0084	
145,320	1,000	.0167	.0130	E=1,216,000.
174,384	1,200	.0225	.0176	First crack.
203,448	1,400	.0291	.0225	
232,512	1,600	.0430	.0312	
235,900	1,623	....	....	Ultimate strength.

No. 10026.

Marks, 95.
Composition: Champion cement, 1; sand, 1; broken stone, 5.
Consistency of mortar, dry.
Age, 1 year 8 months 9 days.
Set in mold 87 hours, in water 3 months 7 days, buried in sand 1 year, 1 month 10 days, in air 3 months 18 days.
Weight per cubic foot, 143.43 pounds.
Sectional area, 145.20 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,520	100	0.	0.	Initial load.
29,040	200	.0001	0.	
43,560	300	.0004	.0001	
58,080	400	.0007	.0001	
87,120	600	.0013	.0003	E=2,500,000.
116,160	800	.0022	.0008	
145,200	1,000	.0032	.0013	E=2,368,000.
174,240	1,200	.0046	.0021	
203,280	1,400	.0063	.0033	E=1,471,000.
232,320	1,600	.0081	.0044	
261,360	1,800	.0107	.0061	
290,400	2,000	.0135	.0082	
319,440	2,200	.0166	.0103	
348,480	2,400	.0192	.0123	First crack.
377,520	2,600	.0236	.0155	
406,560	2,800	.0280	.0190	
456,000	3,140	....	....	Ultimate strength.

No. 10030.

Marks, 98.
Composition: Champion cement, 1; sand, 1; broken stone, 4.79.
Consistency of mortar, plastic.
Age, 1 year 8 months 8 days.
Set in mold 87 hours, in water 3 months 6 days; buried in sand 1 year 1 month 10 days, in air 3 months 18 days.
Weight per cubic foot, 143.22 pounds.
Sectional area, 145.32 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,532	100	0.	0.	Initial load.
29,064	200	.0001	0.	
43,596	300	.0003	0.	
58,128	400	.0006	.0001	
87,192	600	.0013	.0002	E=2,273,000.
116,256	800	.0022	.0007	
145,320	1,000	.0035	.0015	E=2,250,000.
174,384	1,200	.0048	.0023	
203,448	1,400	.0070	.0036	E=1,282,000.
232,512	1,600	.0093	.0051	
261,576	1,800	.0119	.0068	
290,640	2,000	.0153	.0094	
319,704	2,200	.0195	.0122	
348,768	2,400	.0244	.0164	First crack.
377,832	2,600	.0310	.0212	
406,896	2,800	.0364	.0260	
413,600	2,846	....	....	Ultimate strength.

No. 10034.

Marks, 101.
Composition: Champion cement, 1; sand, 1; broken stone, 5.11.
Consistency of mortar, excess.
Age, 1 year 8 months 7 days.
Set in mold 87 hours, in water 3 months 5 days; buried in sand 1 year 1 month 10 days, in air 3 months 18 days.
Weight per cubic foot, 143.04 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	0.	0.	
43,236	300	0.	0.	
57,648	400	.0002	0.	
86,472	600	.0007	0.	E = 3,571,000.
115,296	800	.0018	.0003	
144,120	1,000	.0033	.0012	E = 2,143,000.
172,944	1,200	.0056	.0028	
201,768	1,400	.0083	.0045	
230,592	1,600	.0113	.0067	
259,416	1,800	.0147	.0092	
288,240	2,000	.0186	.0121	First crack.
317,064	2,200	.0235	.0158	
345,888	2,400	.0292	.0204	
403,600	2,800	....	....	Ultimate strength.

No. 10038.

Marks, 96.
Composition: Champion cement, 1; sand, 2; broken stone, 7.14.
Consistency of mortar, dry.
Age, 1 year 8 months 19 days.
Set in mold 93 hours, in water 3 months 6 days; buried in sand 1 year 1 month 10 days, in air 3 months 29 days.
Weight per cubic foot, 143.86 pounds.
Sectional area, 144.24 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	.0001	0.	
43,272	300	.0003	0.	
57,696	400	.0006	.0002	
86,544	600	.0012	.0004	E = 3,125,000.
115,392	800	.0019	.0008	
144,240	1,000	.0028	.0012	E = 2,812,000.
173,088	1,200	.0040	.0018	
201,936	1,400	.0056	.0026	
230,784	1,600	.0075	.0038	E = 1,724,000.
144,240	1,000	....	....	Rested under this load 16 hours.
14,424	100	....	.0052	
259,632	1,800	.0096	.0059	
288,480	2,000	.0116	.0071	
317,328	2,200	.0162	.0105	First crack.
346,176	2,400	0219	.0150	
375,024	2,600	.0301	.0214	
403,872	2,800	.0550	....	Ultimate strength.

No. 10042.

Marks, 99.
Composition: Champion cement, 1; sand, 2; broken stone, 7.25.
Consistency of mortar, plastic.
Age, 1 year 8 months 13 days.
Set in mold 93 hours, in water, 3 months 5 days; buried in sand 1 year 1 month 10 days, in air 3 months 24 days.
Weight per cubic foot, 143.29 pounds.
Sectional area, 144.72 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 472	100	0.	0.	Initial load.
28, 944	200	.0001	0.	
43, 416	300	.0008	.0001	
57, 888	400	.0006	.0001	
86, 832	600	.0013	.0004	E=2,778,000.
115, 776	800	.0025	.0011	
144, 720	1, 000	.0040	.0019	E=2,143,000.
173, 664	1, 200	.0062	.0038	
202, 608	1, 400	.0098	.0058	
231, 552	1, 600	.0138	.0089	
260, 496	1, 800	.0179	.0120	
289, 440	2, 000	.0235	.0167	First crack.
318, 384	2. 200	.0322	.0235	
351, 500	2, 429	....	....	Ultimate strength.

No. 10046.

Marks, 102.
Composition: Champion cement, 1; sand, 2; broken stone, 6.92.
Consistency of mortar, excess.
Age, 1 year 8 months 5 days.
Set in mold 69 hours, in water 3 months 4 days; buried in sand 1 year 1 month 10 days, in air 3 months 18 days.
Weight per cubic foot, 141.17 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 412	100	0.	0.	Initial load.
28, 824	200	.0001	0.	
43. 236	300	.0006	.0001	
57, 648	400	.0013	.0006	
86, 472	600	.0032	.0019	E=1,923,000.
115, 296	800	.0059	.0039	
144, 120	1, 000	.0096	.0069	E=1,667,000.
172, 944	1, 200	.0135	.0100	
201, 768	1, 400	.0186	.0140	First crack.
230, 592	1, 600	.0245	.0189	
259, 416	1, 800	.0324	.0254	
288, 240	2, 000	.0408	.0324	
309, 900	2, 150	....	....	Ultimate strength.

No. 10050.

Marks, 97.
Composition: Champion cement, 1; sand, 3; broken stone, 9.59.
Consistency of mortar, dry.
Age, 1 year 8 months 12 days.
Set in mold 89 hours, in water 3 months 6 days; buried in sand 1 year 1 month 10 days, in air 3 months 22 days.
Weight per cubic foot, 139.81 pounds.
Sectional area, 145.08 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,508	100	0.	0.	Initial load.
29,016	200	.0005	.0002	
43,524	300	.0012	.0007	
58,032	400	.0021	.0012	
87,048	600	.0050	.0035	E = 1,067,000.
116,064	800	.0090	.0068	
145,080	1,000	.0147	.0113	First crack.
174,096	1,200	.0234	.0185	
203,112	1,400	.0334	.0267	
231,000	1,591	.0522	....	Ultimate strength.

No. 10054.

Marks, 100.
Composition: Champion cement, 1; sand, 3; broken stone, 9.78.
Consistency of mortar, plastic.
Age, 1 year 8 months 8 days.
Set in mold 89 hours, in water 3 months 5 days; buried in sand 1 year 1 month 10 days, in air 3 months 19 days.
Weight per cubic foot, 140.91 pounds.
Sectional area, 145.32 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,532	100	0.	0.	Initial load.
29,064	200	.0006	.0002	
43,596	300	.0016	.0010	
58,128	400	.0029	.0020	
87,192	600	.0076	.0058	E = 1,389,000.
116,256	800	.0139	.0110	
145,320	1,000	.0227	.0184	E = 1,046,000.
170,000	....	....	....	First crack.
174,384	1,200	.0334	.0275	
203,448	1,400	.0487	.0402	
228,300	1,571	....	....	Ultimate strength.

No. 10058.

Marks, 103.
Composition: Champion cement, 1; sand, 3; broken stone, 9.
Consistency of mortar, excess.
Age, 1 year 8 months 2 days.
Set in mold 65 hours, in water 3 months 4 days; buried in sand 1 year 1 month 10 days, in air 3 months 15 days.
Weight per cubic foot, 139.15 pounds.
Sectional area, 145.32 square inches.
Guaged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,532	100	0.	0.	Initial load
29 064	200	.0018	.0014	
43,596	300	.0044	.0033	
58,128	400	.0085	.0072	
72,660	500	.0131	.0112	
87,192	600	.0175	.0150	First crack E=1,000,000.
101,724	700	.0235	.0204	
116,256	800	.0288	.0257	
130,788	900	.0348	.0166	
145,320	1,000	.0464	.0410	
159,852	1,100	.0553	.0492	
192,400	1,324	....	....	Ultimate strength.

No. 10062.

Marks, 104.
Composition: Champion cement, 1; sand, 1; broken stone, 3.90.
Consistency of mortar, dry.
Age, 1 year 8 months 2 days.
Set in mold 63 hours, in water 3 months 4 days; buried in sand 1 year 1 month 10 days, in air 3 months 15 days.
Weight per cubic foot, 143.23 pounds.
Sectional area, 143.88 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,388	100	0.	0.	Initial load.
28,776	200	.0002	0.	
43,164	300	.0005	.0001	
57,552	400	.0007	.0001	
86,328	600	.0012	.0002	E=2,500,000.
115,104	800	.0017	.0002	
143,880	1,000	.0023	.0005	E=2,500,000.
172,656	1,200	.0029	.0007	
201,432	1,400	.0036	.0009	E=2,174,000.
230,208	1,600	.0043	.0011	
258,984	1,800	.0050	.0014	
287,760	2,000	.0060	.0019	
316,536	2,200	.0071	.0025	
345,312	2,400	.0081	.0031	
374,088	2,600	.0096	.0040	
402,864	2,800	.0109	.0045	
431,640	3,000	.0127	.0054	
460,416	3,200	.0156	.0075	
489,192	3,400	.0184	.0091	First crack.
517,968	3,600	.0207	.0106	
546,000	3,795	....	....	Ultimate strength.

No. 10063.

Marks, 104*a*.
Composition: Champion cement, 1; sand, 1; broken stone, 3.90.
Consistency of mortar, dry.
Age, 1 year 5 months 12 days.
Set in mold 63 hours, in cool cellar 1 year 4 months 14 days, in air 26 days.
Weight per cubic foot, 140.56 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	.0003	.0001	
43,236	300	.0005	.0001	
57,648	400	.0007	.0002	
72,060	500	.0010	.0003	
86,472	600	.0014	.0005	E=2,778,000.
100,884	700	.0017	.0006	
115,296	800	.0021	.0007	
129,708	900	.0025	.0009	
144,120	1,000	.0029	.0010	E=2,808,000.
158,532	1,100	.0034	....	
172,944	1,200	.0039	.0014	
187,356	1,300	.0045	....	
201,768	1,400	.0052	.0021	
216,180	1,500	.0062	....	E=1,351,000.
230,592	1,600	.0068	.0029	
245,004	1,700	.0079	....	
259,416	1,800	.0087	.0040	
273,828	1,900	.0100	....	
288,240	2,000	.0110	.0054	
302,652	2,100	.0127	....	
310,000	....	....	....	First crack.
317,064	2,200	.0140	.0075	
331,476	2. 300	.0164	....	
345,888	2,400	.0178	.0102	
398,000	2,762	....	....	Ultimate strength.

No. 10066.

Marks, 107.
Composition: Champion cement, 1; sand, 1; broken stone, 4.16.
Consistency of mortar, plastic.
Age, 1 year 6 months 26 days.
Set in mold 63 hours, in water 3 months 3 days; buried in sand 1 year 1 month 10 days, in air 2 months 10 days.
Weight per cubic foot, 142.28 pounds.
Sectional area, 145.20 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 520	100	0.	0.	Initial load.
29, 040	200	.0001	0.	
43, 560	300	.0003	0.	
58, 080	400	.0005	.0001	
72, 600	500	.0007	.0001	
87, 130	600	.0009	.0002	E=3,571,000.
101, 640	700	.0012	.0003	
116, 160	800	.0013	.0003	
130, 680	900	.0016	.0004	
145, 200	1, 000	.0018	.0005	E=3,461,000.
159, 720	1, 100	.0021	.0007	
174, 240	1, 200	.0025	.0008	
188, 760	1, 300	.0030	.0010	
203, 208	1, 400	.0033	.0012	
217, 800	1, 500	.0038	.0013	E=1,724,000.
232, 320	1, 600	.0042	.0014	
246, 840	1, 700	.0050	.0016	
261, 360	1, 800	.0056	.0020	
275, 880	1, 900	.0061	.0024	
290, 400	2, 000	.0070	.0028	
304, 920	2, 100	.0079	.0033	
319, 440	2, 200	.0087	.0037	
333, 960	2, 300	.0096	.0042	
348, 480	2, 400	.0105	.0050	
360, 000	....	....	....	First crack.
363, 000	2, 500	.0116	.0056	
377, 520	2, 600	.0127	.0062	
392, 040	2, 700	.0141	.0072	
406, 560	2, 800	.0153	.0080	
421, 080	2, 900	.0174	.0097	
435, 600	3, 000	.0207	.0122	
476, 000	3, 278	....	....	Ultimate strength.

No. 10070.

Marks, 110.
Composition: Champion cement, 1; sand, 1; broken stone, 4.20.
Consistency of mortar, excess.
Age, 1 year 8 months.
Set in mold 63 hours, in air 3 months 2 days; buried in sand 1 year 1 month 10 days, in air 3 months 15 days.
Weight per cubic foot, 142.36 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	.0002	0.	
43,236	300	.0005	0.	
57,648	400	.0009	.0002	
86,472	600	.0018	.0007	E=2,273,000.
115,296	800	.0030	.0013	
144,120	1,000	.0049	.0026	E=1,956,000.
172,944	1,200	.0068	.0038	
201,768	1,400	.0090	.0052	
230,592	1,600	.0128	.0081	
259,416	1,800	.0206	.0151	First crack.
288,240	2,000	.0247	.0187	
385,500	2,675	....	....	Ultimate strength.

No. 10074.

Marks, 105.
Composition: Champion cement, 1; sand, 2; broken stone, 5.18.
Consistency of mortar, dry.
Age, 1 year 6 months 26 days.
Set in mold 69 hours, in water 3 months 3 days; buried in sand 1 year 1 month 10 days, in air 2 months 10 days.
Weight per cubic foot, 141.01 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	.0001	0.	
43,236	300	.0002	0.	
57,648	400	.0005	.0001	
72,060	500	.0008	.0001	
86,472	600	.0010	.0002	E=3,125,000.
100,884	700	.0012	.0003	
115,296	800	.0015	.0004	
129,708	900	.0018	.0005	
144,120	1,000	.0022	.0006	E=2,812,000.
158,532	1,100	.0026	.0009	
172,944	1,200	.0032	.0012	
187,356	1,300	.0036	.0012	
201,768	1,400	.0041	.0014	
216,180	1,500	.0048	.0018	E=1,389,000.
230,592	1,600	.0053	.0020	
245,004	1,700	.0062	.0025	
259,416	1,800	.0070	.0029	
273,828	1,900	.0083	.0037	
288,240	2,000	.0095	.0043	
302,652	2,100	.0107	.0054	
317,064	2,200	.0126	.0066	
331,476	2,300	.0148	.0083	
345,888	2,400	.0175	.0102	
360,000	....	....	....	First crack.
360,300	2,500	.0219	.0138	
374,400	2,598	....	....	Ultimate strength.

No. 10078.

Marks, 108.

Composition: Champion cement, 1; sand, 2; broken stone, 6.08.

Consistency of mortar, plastic.

Age, 1 year 8 months 1 day.

Set in mold 69 hours, in water 3 months 2 days; buried in sand 1 year 1 month 10 days, in air 3 months 16 days.

Weight per cubic foot, 141.04 pounds.

Sectional area, 144.24 square inches.

Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	.0002	0.	
43,272	300	.0005	.0001	
57,696	400	.0009	.0002	
86,544	600	.0016	.0006	E=2,500,000.
115,392	800	.0026	.0011	
144,240	1,000	.0037	.0016	E=2,143,000.
173,088	1,200	.0051	.0024	
201,936	1,400	.0070	.0035	E=1,163,000.
230,784	1,600	.0094	.0051	
259,632	1,800	.0121	.0073	
288,480	2,000	.0167	.0103	
317,328	2,200	.0238	.0157	First crack.
346,176	2,400	.0380	....	Ultimate strength.

No. 10082.

Marks, 111.

Composition: Champion cement, 1; sand, 2; broken stone, 6.18.

Consistency of mortar, excess.

Age, 1 year 8 months.

Set in mold 93 hours, in water 3 months 1 day; buried in sand 1 year 1 month 10 days, in air 3 months 16 days.

Weight per cubic foot, 141.91 pounds.

Sectional area, 145.32 square inches.

Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,532	100	0.	0.	Initial load.
29,064	200	.0005	.0001	
43,596	300	.0010	.0004	
58,128	400	.0015	.0008	
87,192	600	.0029	.0016	E=1,923,000.
116,256	800	.0046	.0029	
145,320	1,000	.0070	.0044	E=1,731,000.
174,384	1,200	.0101	.0066	
203,448	1,400	.0134	.0091	
232,512	1,600	.0172	.0120	
261,576	1,800	.0221	.0160	First crack.
290,640	2,000	.0250	.0161	Anomalous behavior of micrometer attributed to local yielding of the specimen.
310,000	2,133	.0212	....	Ultimate strength.

No. 10086.

Marks, 106.
Composition: Champion cement, 1; sand, 3; broken stone, 8.03.
Consistency of mortar, dry.
Age, 1 year 6 months 27 days.
Set in mold 66 hours, in water 3 months 4 days; buried in sand 1 year 1 month 10 days, in air 2 months 10 days.
Weight per cubic foot, 138.87 pounds.
Sectional area, 144.96 square inches.
Gauged length, 5.″

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,496	100	0.	0.	Initial load.
28,992	200	.0002	0.	
43,488	300	.0005	.0001	
57,984	400	.0010	.0003	
72,480	500	.0016	.0008	
86,976	600	.0025	.0012	E = 1,923,000.
101,472	700	.0036	.0019	
115,968	800	.0050	.0029	
130,464	900	.0071	.0043	
144,960	1,000	.0094	.0061	E = 1,364,000.
159,456	1,100	.0132	.0093	
173,952	1,200	.0172	.0129	
188,448	1,300	.0211	.0162	
189,000	....	....	....	First crack.
202,944	1,400	.0273	.0217	
217,440	1,500	.0455	.0389	
218,200	1,505	....	....	Ultimate strength.

No. 10090.

Marks, 109.
Composition: Champion cement, 1; sand, 3; broken stone, 8.18.
Consistency of mortar, plastic.
Age, 1 year 8 months.
Set in mold 65 hours, in water 3 months 3 days; buried in sand 1 year 1 month 10 days; in air 3 months 14 days.
Weight per cubic foot, 139.01 pounds.
Sectional area, 147.01 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,701	100	0.	0.	Initial load.
29,402	200	.0004	.0001	
44,103	300	.0010	.0005	
58,804	400	.0020	.0012	
73,505	500	.0033	.0021	
88.206	600	.0047	.0031	E = 1,562,000.
102,907	700	.0066	.0045	
117.608	800	.0098	.0071	
132.309	900	.0115	.0085	First crack.
147,010	1,000	.0151	.0115	
161,711	1,100	.0199	.0156	
176,412	1,200	.0265	.0213	
210,400	1,431	....	....	Ultimate strength.

No. 10094.

Marks, 112.
Composition: Champion cement, 1; sand, 3; broken stone, 8.65.
Consistency of mortar, excess.
Age, 1 year 8 months.
Set in mold 89 hours, in water 3 months 1 day; buried in sand 1 year 1 month 10 days, in air 3 months 16 days.
Weight per cubic foot, 139.65 pounds.
Sectional area, 144.48 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 448	100	0.	0.	Initial load.
28, 896	200	.0011	.0009	
43, 344	300	.0025	.0020	
57, 792	400	.0049	.0039	
72, 240	500	.0079	.0065	
86, 688	600	.0120	.0101	E = 1,316,000.
101, 136	700	.0176	.0150	
115, 584	800	.0231	.0202	First crack.
130, 032	900	.0306	.0270	
144, 480	1, 000	.0390	.0347	
158, 928	1, 100	.0477	.0428	
179, 600	1, 243	....	....	Ultimate strength.

No. 10098.

Marks, 113.
Composition: Buffalo Portland cement, 1; sand, 2; broken stone, 6.43.
Consistency of mortar, plastic.
Age, 1 year 7 months 24 days.
Set in mold 87 hours, in water 3 months 1 day; buried in sand 1 year 1 month 10 days, in air 3 months 9 days.
Weight per cubic foot, 141.07 pounds
Sectional area, 144.96 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 496	100	0.	0.	Initial load.
28, 992	200	.0001	0.	
43, 488	300	.0003	0.	
57, 984	400	.0007	.0001	
72, 480	500	.0012	.0002	
86, 976	600	.0015	.0003	E = 2,083,000.
101, 472	700	.0019	.0005	
115, 968	800	.0025	.0009	
130, 464	900	.0031	.0011	
144, 960	1, 000	.0038	.0015	E = 1,956,000.
159, 456	1, 100	.0045	.0019	
173, 952	1, 200	.0054	.0026	
188, 448	1, 300	.0064	.0032	
202, 944	1, 400	.0079	.0042	
217, 440	1, 500	.0095	.0053	
231, 936	1, 600	.0114	.0067	
246, 432	1, 700	.0140	.0088	
260, 928	1, 800	.0177	.0115	
275, 424	1, 900	.0248	.0180	First crack.
303, 800	2, 096	....	....	Ultimate strength.

MORTAR CUBES.

No. 10105.

Marks, 115.
Composition: Buffalo Portland cement, 1; sand, 2.
Consistency of mortar, dry.
Age, 1 year 7 months 26 days.
Set in mold 89 hours, in water 3 months; buried in sand 1 year 1 month 10 days, in air 3 months 12 days.
Weight per cubic foot, 127.82 pounds.
Sectional area, 144.48 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 448	100	0.	0.	Initial load.
28, 896	200	.0003	0.	
43, 344	300	.0008	.0001	
57, 792	400	.0013	.0001	
86. 688	600	.0024	.0005	E = 1,316,000.
115, 584	800	.0038	.0011	
144, 480	1, 000	.0053	.0017	E = 1,250,000.
173, 376	1, 200	.0068	.0025	
202. 272	1, 400	.0088	.0038	
231, 168	1, 600	.0112	.0054	
260, 064	1, 800	.0156	.0085	
288, 300	1, 995	.0220	....	Ultimate strength.

No. 10109.

Marks, 116.
Composition: Buffalo natural cement, 1; sand, 1.
Consistency of mortar, dry.
Age, 1 year 7 months 23 days.
Set in mold 93 hours, in water 2 months 29 days; buried in sand 1 year 1 month 10 days, in air 3 months 10 days.
Weight per cubic foot, 130.07 pounds.
Sectional area, 145.56 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 556	100	0.	0.	Initial load.
29, 112	200	.0002	0.	
43, 668	300	.0006	0.	
58, 224	400	.0009	0.	
87, 336	600	.0016	.0001	E = 1,667,000.
116, 448	800	.0026	.0002	
145, 560	1, 000	.0036	.0005	E = 1,452,000.
174, 672	1, 200	.0046	.0008	
203, 784	1, 400	.0058	.0013	E = 1,389,000.
232, 896	1, 600	.0073	.0020	
262, 008	1, 800	.0084	.0024	
291, 120	2, 000	.0100	.0033	
320. 232	2, 200	.0116	.0044	
349, 344	2, 400	.0131	.0053	
878, 456	2, 600	.0153	.0068	
407, 568	2, 800	.0181	.0090	
436, 680	3, 000	.0207	.0107	
465, 792	3, 200	.0242	.0133	
494, 904	3, 400	.0288	.0168	
506, 400	3, 479	....	....	Ultimate strength.

No. 10113.

Marks, 119.
Composition: Buffalo natural cement, 1; sand, 1.
Consistency of mortar, plastic.
Age, 1 year 7 months 25 days.
Set in mold 69 hours, in water 2 months 28 days; buried in sand 1 year 1 month 10 days, in air 3 months 14 days.
Weight per cubic foot, 127.75 pounds.
Sectional area, 144.24 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 424	100	0.	0.	Initial load.
28, 848	200	.0001	0.	
43, 272	300	.0004	0.	
57, 696	400	.0005	0.	
86, 544	600	.0010	0.	E=2,500,000.
115, 392	800	.0017	0.	
144, 240	1, 000	.0025	.0001	E– 1,875,000.
173, 088	1, 200	.0037	.0004	
201, 936	1, 400	.0047	.0007	E=1,190,000.
230, 784	1, 600	.0061	.0013	
259, 632	1. 800	.0073	.0017	
288, 480	2, 000	.0093	.0027	
317, 328	2, 200	.0111	.0038	
346, 176	2, 400	.0138	.0055	
375, 024	2, 600	.0179	.0081	
403, 100	2, 795	....	....	Ultimate strength.

No. 10117.

Marks, 122.
Composition: Buffalo natural cement, 1; sand, 1.
Consistency of mortar, excess.
Age, 1 year 6 months 20 days.
Set in mold 69 hours, in water 2 months 27 days; buried in sand 1 year 1 month 10 days, in air 2 months 10 days.
Weight per cubic foot, 125.39 pounds.
Sectional area, 146.05 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,605	100	0.	0.	Initial load.
29,210	200	.0002	0.	
43,815	300	.0004	0.	
58,420	400	.0006	0.	
73,025	500	.0009	.0001	
87,630	600	.0012	.0001	E=2,273,000.
102,235	700	.0015	.0002	
116,840	800	.0020	.0003	
131,445	900	.0025	.0004	
146,050	1,000	.0030	.0005	E=1,800,000.
160,655	1,100	.0036	.0007	
175,260	1,200	.0042	.0009	
189,865	1,300	.0049	.0011	
204,470	1,400	.0058	.0014	
219,075	1,500	.0070	.0018	E=833,000.
233,680	1,600	.0081	.0024	
248,285	1,700	.0093	.0030	
262,890	1,800	.0107	.0038	
277,495	1,900	.0128	.0050	
292,100	2,000	.0149	.0064	
306,200	....	....	....	First crack.
315,690	2,161	....	....	Ultimate strength.

No. 10121.

Marks, 117.
Composition: Buffalo natural cement, 1; sand, 2.
Consistency of mortar, dry.
Age, 1 year 7 months 25 days.
Set in mold 89 hours, in water 2 months 29 days; buried in sand 1 year 1 month 10 days, in air 3 months 12 days.
Weight per cubic foot, 129.39 pounds.
Sectional area, 145.92 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,592	100	0.	0.	Initial load.
29,184	200	.0002	0.	
43,776	300	.0006	0.	
58,368	400	.0010	0.	
87,552	600	.0019	.0002	E=1,471,000.
116,736	800	.0032	.0006	
145,920	1,000	.0044	.0011	E=1,364,000.
175,104	1,200	.0059	.0019	
204,288	1,400	.0080	.0031	E=1,042,000.
233,472	1,600	.0100	.0043	
262,656	1,800	.0132	.0066	
291,840	2,000	.0201	.0120	
321,024	2,200	....	....	Ultimate strength.

No. 10125.

Marks, 120.
Composition: Buffalo natural cement, 1; sand, 2.
Consistency of mortar, plastic.
Age, 1 year 7 months 23 days.
Set in mold 65 hours, in water 2 months 28 days; buried in sand 1 year 1 month 10 days, in air 3 months 12 days.
Weight per cubic foot, 123.46 pounds.
Sectional area, 144.72 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,472	100	0.	0.	Initial load.
28,944	200	.0002	0.	
43,416	300	.0006	0.	
57,888	400	.0010	0.	
86,832	600	.0022	.0002	E=1,250,000.
115,776	800	.0036	.0009	
144,720	1,000	.0053	.0017	E=1,250,000.
178,664	1,200	.0075	.0030	
202,608	1,400	.0105	.0049	
231,552	1,600	.0160	.0089	
258,000	1,783	....	....	Ultimate strength.

No. 10129.

Marks, 123.
Composition: Buffalo natural cement, 1; sand, 2.
Consistency of mortar, excess.
Age, 1 year 7 months 25 days.
Set in mold 65 hours, in water 2 months 27 days; buried in sand 1 year 1 month 10 days, in air 3 months 15 days.
Weight per cubic foot, 122.15 pounds.
Sectional area, 145.56 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,556	100	0.	0.	Initial load.
29,112	200	.0004	0.	
43,668	300	.0008	.0001	
58,224	400	.0013	.0002	
72,780	500	.0019	.0003	
87,360	600	.0025	.0005	E=1,250,000.
101,892	700	.0032	.0008	
116,448	800	.0041	.0011	
131,004	900	.0048	.0015	
145,560	1,000	.0058	.0020	E=1,184,000.
160,116	1,100	.0070	.0028	
174,672	1,200	.0084	.0036	
189,228	1,300	.0101	.0047	
203,784	1,400	.0119	.0060	
218,340	1,500	.0148	.0081	
232,896	1,600	.0194	.0114	
247,100	1,698	.0270	....	Ultimate strength.

No. 10133.

Marks, 118.
Composition: Buffalo natural cement, 1; sand, 3.
Consistency of mortar, dry.
Age, 1 year 7 months 25 days.
Set in mold 87 hours, in water 2 months 29 days; buried in sand 1 year 1 month 10 days, in air 3 months 12 days.
Weight per cubic foot, 122.14 pounds.
Sectional area, 146.41 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,641	100	0.	0.	Initial load.
29,282	200	.0010	.0005	
43,923	300	.0022	.0012	
58,564	400	.0033	.0019	
87,846	600	.0062	.0038	E=1,042,000.
117,128	800	.0099	.0061	
146,410	1,000	.0165	.0109	
169,000	1,154	....	....	Ultimate strength.

No. 10137.

Marks, 121.
Composition: Buffalo natural cement, 1; sand, 3.
Consistency of mortar, plastic.
Age, 1 year 7 months 11 days.
Set in mold 63 hours, in water 2 months 28 days; buried in sand 1 year 1 month 10 days, in air 3 months.
Weight per cubic foot, 119.55 pounds.
Sectional area, 144.84 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,484	100	0.	0.	Initial load.
28,968	200	.0002	0.	
43,452	300	.0007	.0001	
57,936	400	.0013	.0004	
72,420	500	.0023	.0009	
86,904	600	.0040	.0017	E = 1,087,000.
101,388	700	.0060	.0030	
115,872	800	.0085	.0045	
130,356	900	.0118	.0074	
144,840	1,000	.0250	.0186	Ultimate strength.

No. 10140.

Marks, 121*c*.
Composition: Buffalo natural cement, 1; sand, 3.
Consistency of mortar, plastic.
Age, 1 year 5 months 7 days.
Set in mold 63 hours, in open air covered with sacking and wet with water several times a day for 1 month 28 days, then took weather as it came 1 year 3 months 6 days.
Weight per cubic foot, 120.01 pounds.
Sectional area, 146.05 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14.605	100	0.	0.	Initial load.
29,210	200	.0010	.0006	
43,815	300	.0025	.0013	
58.420	400	.0045	.0029	
73,025	500	.0079	.0053	
87,630	600	.0110	.0076	E = 735,000.
101,000	692	.0230	.0179	Ultimate strength.

No. 10141.

Marks, 124.
Composition: Buffalo natural cement, 1; sand, 3.
Consistency of mortar, excess.
Age, 1 year 7 months 10 days.
Set in mold 63 hours, in water 2 months 27 days; buried in sand 1 year 1 month 10 days, in air 3 months.
Weight per cubic foot, 116.67 pounds.
Sectional area, 144.36 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,436	100	0.	0.	Initial load.
28,872	200	.0009	.0004	
43,308	300	.0019	.0008	
57,744	400	.0035	.0017	
72,180	500	.0058	.0034	
86,616	600	.0096	.0062	E=735,000.
101,052	700	.0174	.0123	
112,100	776	.0219	....	Ultimate strength.

No. 10145.

Marks, 125.
Composition: Empire cement, 1; sand, 2.
Consistency of mortar, dry.
Age, 1 year 7 months 18 days.
Set in mold 69 hours, in water 2 months 26 days; buried in sand 1 year 1 month 10 days, in air 3 months 9 days.
Weight per cubic foot, 126.94 pounds.
Sectional area, 144 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,400	100	0.	0.	Initial load.
28,800	200	0.	0.	
43,200	300	.0001	0.	
57,600	400	.0002	0.	
86,400	600	.0007	0.	E=3,571,000.
115,200	800	.0013	0.	
144,000	1,000	.0018	0.	E=2,500,000.
172,800	1,200	.0025	.0001	
201,600	1,400	.0032	.0001	E=1,923,000.
230,400	1,600	.0038	.0003	
259,200	1,800	.0043	.0004	
288,000	2,000	.0050	.0006	
316,800	2,200	.0058	.0008	
345,600	2,400	.0066	.0012	
374,400	2,600	.0074	.0013	
403,200	2,800	.0083	.0016	
432,000	3,000	.0093	.0019	
460,800	3,200	.0106	.0025	
489,600	3,400	.0120	.0031	
518,400	3,600	.0140	.0041	
547,200	3,800	.0169	.0059	
561,200	3,897	....	....	Ultimate strength.

No. 10149.

Marks, 128.
Composition: Empire cement, 1; sand, 2.
Consistency of mortar, plastic.
Age, 1 year 6 months 22 days.
Set in mold 93 hours, in water 2 months 24 days; buried in sand 1 year 1 month 10 days, in air 3 months 14 days.
Weight per cubic foot, 126.05 pounds.
Sectional area, 144.24 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	.0002	0.	
43,272	300	.0005	0.	
57,696	400	.0008	.0001	
86,544	600	.0014	.0001	E=1,923,000.
115,892	800	.0020	.0002	
144,240	1,000	.0025	.0002	E=1,956,000.
173,088	1,200	.0031	.0003	
201,936	1,400	.0037	.0005	E=2,083,000.
230,784	1,600	.0043	.0007	
259,632	1,800	.0051	.0009	
288,480	2,000	.0058	.0011	
317,328	2,200	.0068	.0016	
346,176	2,400	.0076	.0018	
375,024	2,600	.0086	.0023	
403,872	2,800	.0099	.0027	
432,720	3,000	.0112	.0032	
461,568	3,200	.0130	.0043	
490,416	3,400	.0153	.0055	
519,264	3,600	.0192	.0077	First crack.
525,300	3,642	....	....	Ultimate strength.

No. 10153.

Marks, 126.
Composition: Empire cement, 1; sand, 3.
Consistency of mortar, dry.
Age, 1 year 7 months 18 days.
Set in mold 65 hours, in water 2 months 26 days; buried in sand 1 year 1 month 10 days, in air 3 months 9 days.
Weight per cubic foot, 122.07 pounds.
Sectional area, 144.72 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,472	100	0.	0.	Initial load.
28,944	200	.0001	0.	
43,416	300	.0003	0.	
57,888	400	.0006	0.	
86,832	600	.0011	.0001	E=2,500,000.
115,776	800	.0018	.0002	
144,720	1,000	.0026	.0003	E=1,956,000.
173,664	1,200	.0034	.0006	
202,608	1,400	.0044	.0009	E=1,250,000.
231,552	1,600	.0056	.0013	
260,496	1,800	.0073	.0019	
289,440	2,000	.0093	.0030	
318,384	2,200	.0123	.0047	
347,328	2,400	.0175	.0082	
361,000	2,494	....	....	Ultimate strength.

No. 10161.

Marks, 127.
Composition: Empire cement, 1; sand, 4.
Consistency of mortar, dry.
Age, 1 year 8 months.
Set in mold 63 hours, in water 2 months 26 days; buried in sand 1 year 1 month 10 days, in air 3 months 21 days.
Weight per cubic foot, 119.50 pounds.
Sectional area, 144.72 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,472	100	0.	0.	Initial load.
28,944	200	.0000	0.	
43,416	300	.0001	0.	
57,888	400	.0002	0.	
86,832	600	.0008	0.	E=3,125,000.
115,776	800	.0017	.0002	
144,720	1,000	.0030	.0006	E=1,875,000.
173,664	1,200	.0043	.0010	
202,608	1,400	.0067	.0020	
231,552	1,600	.0114	.0047	
258,000	1,782	....	....	Ultimate strength.

No. 10165.

Marks, 130.
Composition: Empire cement, 1; sand, 4.
Consistency of mortar, plastic.
Age, 1 year 7 months 22 days.
Set in mold 87 hours, in water 2 months 24 days; buried in sand 1 year 1 month 10 days, in air 3 months 14 days.
Weight per cubic foot, 118.96 pounds.
Sectional area, 144.24 square inches.
Gauged length, 5″.

Applied loads.		In guaged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	.0004	0.	
43,272	300	.0010	0.	
57,696	400	.0016	.0001	
86,544	600	.0028	.0006	E=1,136,000.
115,392	800	.0041	.0011	
144,240	1,000	.0055	.0019	E=1,250,000.
173,088	1,200	.0075	.0030	
201,936	1,400	.0102	.0046	
230,784	1,600	.0166	.0091	
247,600	1,717	.0250	....	Ultimate strength.

No. 10169.

Marks, 134.
Composition: Ironclad cement, 1; sand, 2.
Consistency of mortar, dry.
Age, 1 year 7 months 21 days.
Set in mold 69 hours, in water 2 months 24 days; buried in sand 1 year 1 month 10 days, in air 3 months 14 days.
Weight per cubic foot, 129.67 pounds.
Sectional area, 145.32 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,532	100	0.	0.	Initial load.
29,064	200	.0001	0.	
43,596	300	.0002	0.	
58,128	400	.0005	0.	
87,192	600	.0010	0.	E=2,500,000.
116,256	800	.0015	0.	
145,320	1,000	.0021	0.	E=2,143,000.
174,384	1,200	.0026	.0002	
203,448	1,400	.0032	.0003	E=2,331,000.
232,512	1,600	.0038	.0004	
261,576	1,800	.0043	.0005	
290,640	2,000	.0048	.0006	
319,704	2,200	.0053	.0006	
348,768	2,400	.0059	.0007	
377,832	2,600	.0064	.0008	
406,896	2,800	.0070	.0009	
435,960	3,000	.0077	.0011	
465,024	3,200	.0083	.0014	
494,088	3,400	.0093	.0015	
523,152	3,600	.0103	.0020	
552,216	3,800	.0118	.0024	
581,280	4,000	.0143	.0035	Ultimate strength.

No. 10173.

Marks, 135.
Composition: Ironclad cement, 1; sand, 3.
Consistency of mortar, dry.
Age, 1 year 7 months 23 days.
Set in mold 65 hours, in water 2 months 24 days; buried in sand 1 year 1 month 10 days, in air 3 months 16 days.
Weight per cubic foot, 125.63 pounds.
Sectional area, 144.36 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,436	100	0.	0.	Initial load.
28,872	200	.0002	0.	
43,308	300	.0005	0.	
57,744	400	.0008	0.	
86,616	600	.0013	.0001	E=2,083,000.
115,488	800	.0018	.0002	
144,360	1,000	.0025	.0003	E=2,045,000.
173,232	1,200	.0032	.0005	
202,104	1,400	.0040	.0007	E=1,724,000.
230,976	1,600	.0047	.0010	
259,848	1,800	.0058	.0013	
288,720	2,000	.0068	.0017	
317,592	2,200	.0082	.0022	
846,464	2,400	.0100	.0032	
875,336	2,600	.0122	.0043	
404,208	2,800	.0161	.0066	
429,200	2,973	....	....	Ultimate strength.

No. 10177.

Marks, 136.
Composition: Ironclad cement, 1; sand, 4.
Consistency of mortar, dry.
Age, 1 year 7 months 23 days.
Set in mold 63 hours, in water 2 months 24 days; buried in sand 1 year 1 month 10 days, in air 3 months 16 days.
Weight per cubic foot, 121.87 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	.0002	0.	
43,380	300	.0005	0.	
57,840	400	.0009	0.	
86,760	600	.0017	.0001	E=1,562,000.
115,680	800	.0027	.0002	
144.600	1,000	.0040	.0008	E=1,406,000.
173.520	1,200	.0056	.0016	
202.440	1,400	.0078	.0026	
231.360	1,600	.0106	.0046	
260,280	1,800	.0185	.0104	Ultimate strength.

No. 10181.

Marks, 143.
Composition: Champion cement, 1; sand, 1.
Consistency of motar, dry.
Age, 1 year 7 months 6 days.
Set in mold 45 hours, in water 2 months 24 days; buried in sand 1 year 1 month 10 days, in air 3 months.
Weight per cubic foot, 127.61 pounds.
Sectional area, 144.00 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,400	100	0.	0.	Initial load.
28,800	200	.0002	0.	
57,600	400	.0009	.0001	
86,400	600	.0016	.0002	E = 1,786,000.
115,200	800	.0022	.0004	
144,000	1,000	.0030	.0006	E = 1,875,000.
172,800	1,200	.0037	.0009	
201,600	1,400	.0044	.0011	E = 2,000,000.
230,400	1,600	.0050	.0012	
259,200	1,800	.0059	.0015	
288,000	2,000	.0066	.0017	
316,800	2,200	.0076	.0021	
345,600	2,400	.0086	0027	
374,400	2,600	.0096	.0032	
403,200	2,800	.0111	.0040	
432,000	3,000	.0125	.0046	
460,800	3,200	.0140	.0054	
489,600	3,400	.0162	.0068	
518,400	3,600	.0190	.0083	
557,200	3,869	....	....	Ultimate strength.

No. 10185.

Marks, 144.
Composition: Champion cement, 1; sand, 2.
Consistency of mortar, dry.
Age, 1 year 7 months 6 days.
Set in mold 41 hours, in water 2 months 24 days; buried in sand 1 year 1 month 10 days, in air 3 months.
Weight per cubic foot, 124.81 pounds.
Sectional area, 144.24 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	.0003	0.	
43,272	300	.0007	.0001	
57,696	400	.0011	.0002	
72,120	500	.0015	.0003	
86,544	600	.0019	.0004	E = 1,667,000.
100,968	700	.0022	.0005	
115,392	800	.0027	.0006	
129,816	900	.0031	.0007	
144,240	1,000	.0035	.0009	E = 1,731,000.
158,664	1,100	.0039	.0011	
173,088	1,200	.0042	.0012	
187,512	1,300	.0048	.0015	
201,936	1,400	.0052	.0016	
216,360	1,500	.0057	.0018	E = 1,667,000.
230,784	1,600	.0062	.0022	
245,208	1,700	.0070	.0024	
259,632	1,800	.0078	.0029	
274,056	1,900	.0088	.0036	
288,480	2,000	.0097	.0041	
302,904	2,100	.0110	.0049	
317,328	2,200	.0120	.0054	
331,752	2,300	.0138	.0064	
346,176	2,400	.0156	.0080	
360,600	2,500	.0185	.0099	
375,024	2,600	.0233	.0136	
388,000	2,690	....	....	Ultimate strength.

No. 10189.

Marks, 145.
Composition: Champion cement, 1; sand, 3.
Consistency of mortar, dry.
Age, 1 year 7 months 7 days.
Set in mold 39 hours, in water 2 months 24 days; buried in sand 1 year 1 month 10 days, in air 3 months 1 day.
Weight per cubic foot, 119.86 pounds.
Sectional area, 143.88 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,388	100	0.	0.	Initial load.
28,776	200	.0012	.0005	
43,164	300	.0022	.0008	
57,552	400	.0031	.0012	
71,940	500	.0038	.0016	
86,328	600	.0045	.0020	E=1,000,000.
100,716	700	.0055	.0027	
115,104	800	.0064	.0034	
129,492	900	.0075	.0040	
143,880	1,000	.0090	.0051	E=1,154,000.
43,164	300	....	....	Rested 16 hours under this load.
143,880	1,000	.0095	.0061	
158,268	1,100	.0103	.0063	
172,656	1,200	.0126	.0078	
187,044	1,300	.0154	.0100	
201,432	1,400	.0216	.0154	
227,500	1,581	....	....	Ultimate strength.

TABLE NO. 1.

CONCRETE CUBES MADE OF THE WAYLAND PORTLAND CEMENT COMPANY'S "GENESEE" BRAND OF CEMENT.

No. of test.	Marks.	Composition.			In mold.	In water.		Buried in sand.			In cool cellar.			In open air covered with sacking, and wet with water several times a day.		Out of doors, exposed to weather.			Under cover in dry place.		Age when tested.		
		Cement.	Sand.	Broken stone.	*Hours.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*
9650	7	1	1	4.71	23	4	17	1	1	10									3	7	1	9	4
9651	7*a*				23						1	5	26							28	1	6	24
9652	7*b*				23											1	5	26		21	1	6	17
9653	7*c*				23									3	16	1	2	10		29	1	6	25
9654	12	1	1	5.25	23	4	15	1	1	10									3	19	1	9	14
9655	12*a*				23						1	5	24							21	1	6	15
9656	12*b*				23											1	5	24	1	14	1	7	8
9657	12*c*				23									3	14	1	2	10	1	1	1	6	26
9658	16	1	1	4.98	56	4	12	1	1	10									3	21	1	9	14
9659	16*a*				56						1	5	21							29	1	6	21
9660	16*b*				56											1	5	21	1	22	1	7	14
9661	16*c*				56									3	11	1	2	10	1	9	1	7	1
9662	1	1	2	7.14	65	4	19	1	1	10									3	24	1	9	25
9663	1*a*				65						1	5	28						1	1	1	7	1
9664	1*b*				65											1	5	28	1	22	1	7	22
9665	1*c*				65									3	18	1	2	10	1	4	1	7	4
9666	17	1	2	6.62	52	4	12	1	1	10									3	23	1	9	15
9667	17*a*				52						1	5	21							22	1	6	14
9668	17*b*				52											1	5	21	1	22	1	7	14
9669	17*c*				52									3	11	1	2	10	1	7	1	6	30
9670	8	1	3	8.93	40	4	16	1	1	10									2	10	1	8	7
9671	8*a*				40						1	5	25							25	1	6	21
9672	8*b*				40											1	5	25		22	1	6	18
9673	8*c*				40									3	15	1	2	10	2	1	1	7	28
9674	2	1	3	9.80	63	4	19	1	1	10									8	18	1	9	19
9675	2*a*				63						1	5	28						1	1	1	7	1
9676	2*b*				63											1	5	28	1	23	1	7	23
9677	2*c*				63									3	18	1	2	10	1	21	1	7	21

CONCRETE CUBES MADE OF THE WAYLAND PORTLAND CEMENT COMPANY'S "GENESEE" BRAND OF CEMENT—Continued.

No. of test.	Marks.	Composition.			In mold.	In water.		Buried in sand.			In cool cellar.			In open air covered with sacking, and wet with water several times a day.		Out of doors, exposed to weather.			Under cover in dry place.		Age when tested.		
		Cement.	Sand.	Broken stone.																			
					Hours.	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*
9678	13	1	3	10.14	45	4	14	1	1	10									3	17	1	9	12
9679	13*a*				45						1	5	23							25	1	6	19
9680	13*b*				45											1	5	23	1	22	1	7	16
9681	13*c*				45									3	13	1	2	10	1	1	1	6	26
9682	18	1	3	9.78	63	4	11	1	1	10									3	29	1	9	22
9683	18*a*				63						1	5	20							24	1	6	16
9684	18*b*				63											1	5	20	1	22	1	7	14
9685	18*c*				63									3	10	1	2	10	1	7	1	6	30
9686	9	1	4	12.19	28	4	16	1	1	10									2	10	1	8	6
9687	9*a*				28						1	5	25							25	1	6	20
9688	9*b*				28											1	5	25	1	21	1	7	16
9689	9*c*				28									3	15	1	2	10	1	2	1	6	28
9690	14	1	4	12.86	79	4	12	1	1	10									3	16	1	9	10
9691	14*a*				79						1	5	21							25	1	6	18
9692	14*b*				79											1	5	21	1	21	1	7	14
9693	14*c*				79									3	11	1	2	10		29	1	6	22
9694	3	1	4	11.62	47	4	19	1	1	10									3	1	1	9	1
9695	3*a*				47						1	5	28							29	1	6	28
9696	3*b*				47											1	5	28	1	13	1	7	12
9697	3*c*				47									3	18	1	2	10	1	2	1	7	1
9698	10	1	5	14.70	23	4	16	1	1	10									2	7	1	8	3
9699	10*a*				23						1	5	25							26	1	6	21
9700	10*b*				33											1	5	25		21	1	6	16
9701	10*c*				23									3	15	1	2	10	1	7	1	7	2
9702	15	1	5	15.00	74	4	12	1	1	10									3	9	1	9	3
9703	15*a*				74						1	5	21						1	1	1	6	25
9704	15*b*				74											1	5	21	1	23	1	7	16
9705	15*c*				74									3	11	1	2	10	1	2	1	6	26
9706	11	1	6	16.66	29	4	15	1	1	10									3	18	1	9	13
9707	11*a*				29						1	5	24							19	1	6	13
9708	11*b*				29											1	5	24		22	1	6	16
9709	11*c*				29									3	14	1	2	10		21	1	6	15

9710	25	1	1	4.16	40	4	8	1	1	10									3	21	1	9	10
9711	25*a*				40						1	5	17							28	1	6	16
9712	25*b*				40											1	5	17	1	14	1	7	2
9713	25*c*				40									3	7	1	2	10	1	7	1	6	26
9714	4	1	2	6.17	29	4	18	1	1	10									3	5	1	9	8
9715	4*a*				29						1	5	27						1	0	1	6	28
9716	4*b*				29											1	5	27	1	13	1	7	10
9717	4*c*				29									3	17	1	2	10	1	8	1	7	5
9718	19	1	2	6.43	55	4	10	1	1	10									3	14	1	9	5
9719	19*a*				55						1	5	19							25	1	6	15
9720	19*b*				55											1	5	19	1	21	1	7	11
9721	19*c*				55									3	9	1	2	10	1	8	1	6	29
9722	22	1	2	5.62	39	4	9	1	1	10									3	19	1	9	9
9723	22*a*				39						1	5	18						1	0	1	6	20
9724	22*b*				39											1	5	18	1	13	1	7	2
9725	22*c*				39									3	8	1	2	10	1	1	1	6	21
9726	26	1	2	6.82	47	4	7	1	1	10									3	1	1	8	20
9727	26*a*				47						1	5	16							24	1	6	11
9728	26*b*				47											1	5	16	1	21	1	7	8
9729	26*c*				47									3	6	1	2	10	1	7	1	6	25
9730	5	1	3	8.12	27	4	18	1	1	10									3	28	1	9	26
9731	5*a*				27						1	5	27							19	1	6	16
9732	5*b*				27											1	5	27	1	21	1	7	18
9733	5*c*				27									3	17	1	2	10	1	4	1	7	1
9734	20	1	3	7.50	49	4	10	1	1	10									3	28	1	9	19
9735	20*a*				49						1	5	19							25	1	6	15
9736	20*b*				49											1	5	19	1	23	1	7	13
9737	20*c*				49									3	9	1	2	10	1	8	1	6	29
9738	23	1	3	8.03	21	4	9	1	1	10									2	1	1	7	21
9739	23*a*				21						1	5	18							22	1	6	10
9740	23*b*				21											1	5	18	1	21	1	7	9
9741	23*c*				21									3	8	1	2	10	1	7	1	6	26
9742	27	1	3	8.80	45	4	7	1	1	10									3	28	1	9	16
9743	27*a*				45						1	5	16							24	1	6	11
9744	27*b*				45											1	5	16	1	13	1	7	0
9745	27*c*				45									3	6	1	2	10	1	21	1	7	8
9746	21	1	4	10.90	45	4	9	1	1	10									3	23	1	9	13
9747	21*a*				45						1	5	18							24	1	6	13
9748	21*b*				45											1	5	18	1	21	1	7	10
9749	21*c*				45									3	8	1	2	10		29	1	6	18

CONCRETE CUBES MADE OF THE WAYLAND PORTLAND CEMENT COMPANY'S "GENESEE" BRAND OF CEMENT—Continued.

No. of test.	Marks.	Composition.			In mold.	In water.		Buried in sand.			In cool cellar.			In open air covered with sacking, and wet with water several times a day.		Out of doors, exposed to weather.			Under cover in dry place.		Age when tested.		
		Cement.	Sand.	Broken stone.	*Hours.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*
9750	24	1	4	10.90	42	4	8	1	1	10									3	29	1	9	18
9751	24*a*				42						1	5	17							21	1	6	9
9752	24*b*				42											1	5	17	1	13	1	7	1
9753	24*c*				42									8	7	1	2	10	1	7	1	6	26
9754	6	1	4	10.63	23	4	18	1	1	10									3	7	1	9	5
9755	6*a*				23						1	5	27							19	1	6	16
9756	6*b*				23											1	5	27	1	21	1	7	18
9757	6*c*				23									8	17	1	2	10	1	1	1	6	29
9758	28	1	4	10.40	69	4	5	1	1	10									3	21	1	9	8
9759	28*a*				69						1	5	14							29	1	6	15
9760	28*b*				69											1	5	14	1	13	1	6	30
9761	28*c*				69									3	4	1	2	10	1	4	1	6	·21

CONCRETE CUBES MADE OF THOS. MILLEM & SON'S "WAYLAND" BRAND OF CEMENT.

9762	29	1	1	4.50	65	4	5	1	1	10									3	5	1	8	23
9763	29*a*				65						1	5	14							19	1	6	5
9764	29*b*				65											1	5	14	1	14	1	7	0
9765	29*c*				65									3	4	1	2	10	1	8	1	6	25
9766	34	1	1	6.50	47	4	8	1	1	10									8	15	1	8	30
9767	34*a*				47						1	5	12							25	1	6	8
9768	34*b*				47											1	5	12	1	23	1	7	6
9769	34*c*				47									3	2	1	2	10	1	2	1	6	16
9770	39	1	1	5.23	23	4	2	1	1	10									3	16	1	8	29
9771	39*a*				23						1	5	11							28	1	6	9
9772	39*b*				23											1	5	11	1	21	1	7	3
9773	39*c*				23									3	2	1	2	10		29	1	6	10
9774	30	1	2	6.62	63	4	5	1	1	10									8	7	1	8	25
9775	30*a*				63						1	5	14							19	1	6	5
9776	30*b*				63											1	5	14	1	23	1	7	9
9777	30*c*				63									3	5	1	2	10	1	4	1	6	21

9778	35	1	2	7.39	45	4	3	1	1	10	...	...	...	...	...	...	...	...	3	15	1	8	30
9779	35*a*	...	...	...	45	...	...	...	...	...	1	5	12	...	...	...	...	...	...	19	1	6	2
9780	35*b*	...	...	...	45	...	...	...	...	...	...	...	...	...	...	1	5	12	...	22	1	6	5
9781	35*c*	...	...	...	45	...	...	...	...	...	...	...	...	3	2	1	2	10	1	7	1	6	21
9782	40	1	2	6.23	21	4	2	1	1	10	...	...	...	...	...	...	...	...	3	14	1	8	27
9783	40*a*	...	...	...	21	...	...	...	...	...	1	5	11	...	...	...	...	...	...	23	1	6	4
9784	40*b*	...	...	...	21	...	...	...	...	...	...	...	...	...	...	1	5	11	1	26	1	7	8
9785	40*c*	...	...	...	21	...	...	...	...	...	...	...	...	3	2	1	2	10	1	1	1	6	13
9786	31	1	3	9.38	69	4	4	1	1	10	...	...	...	...	...	...	...	...	3	15	1	9	1
9787	31*a*	...	...	...	69	...	...	...	...	...	1	5	13	...	...	...	...	...	...	25	1	6	10
9788	31*b*	...	...	...	69	...	...	...	...	...	...	...	...	...	...	1	5	13	1	21	1	7	6
9789	31*c*	...	...	...	69	...	...	...	...	...	...	...	...	3	3	1	2	10	1	26	1	7	11
9790	36	1	3	9.57	27	4	3	1	1	10	...	...	...	...	...	...	...	...	3	5	1	8	19
9791	36*a*	...	...	...	27	...	...	...	...	...	1	5	12	...	...	...	...	...	...	19	1	6	1
9792	36*b*	...	...	...	27	...	...	...	...	...	...	...	...	...	...	1	5	12	...	19	1	6	1
9793	36*c*	...	...	...	27	...	...	...	...	...	...	...	...	3	2	1	2	10	...	21	1	6	3
9794	41	1	3	9.37	29	4	1	1	1	10	...	...	...	...	...	...	...	...	3	14	1	8	26
9795	41*a*	...	...	...	29	...	...	...	...	...	1	5	10	...	...	...	...	...	...	21	1	6	1
9796	41*b*	...	...	...	29	...	...	...	...	...	...	...	...	...	...	1	5	10	1	23	1	7	4
9797	41*c*	...	...	...	29	...	...	...	...	...	...	...	...	3	1	1	2	10	1	22	1	7	8
9798	32	1	4	12.86	65	4	4	1	1	10	...	...	...	...	...	...	...	...	3	18	1	9	4
9799	32*a*	...	...	...	65	...	...	...	...	...	1	5	13	...	...	...	...	...	...	25	1	6	10
9800	32*b*	...	...	...	65	...	...	...	...	...	...	...	...	...	...	1	5	13	...	21	1	6	6
9801	32*c*	...	...	...	65	...	...	...	...	...	...	...	...	3	3	1	2	10	...	29	1	6	14
9802	37	1	4	12.80	41	4	2	1	1	10	...	...	...	...	...	...	...	...	2	1	1	7	15
9803	37*a*	...	...	...	41	...	...	...	...	...	1	5	11	...	...	...	...	...	...	24	1	6	6
9804	37*b*	...	...	...	41	...	...	...	...	...	...	...	...	...	...	1	5	11	1	14	1	6	27
9805	37*c*	...	...	...	41	...	...	...	...	...	...	...	...	3	2	1	2	10	1	7	1	6	20
9806	42	1	4	12.71	25	4	1	1	1	10	...	...	...	...	...	...	...	...	3	28	1	9	9
9807	42*a*	...	...	...	25	...	...	...	...	...	1	5	10	...	...	...	...	...	...	19	1	5	30
9808	42*b*	...	...	...	25	...	...	...	...	...	...	...	...	...	...	1	5	10	1	22	1	7	4
9809	42*c*	...	...	...	25	...	...	...	...	...	...	...	...	3	1	1	2	10	1	1	1	6	12
9810	33	1	5	15.41	21	4	4	1	1	10	...	...	...	...	...	...	...	...	3	28	1	9	12
9811	33*a*	...	...	...	21	...	...	...	...	...	1	5	13	...	...	...	...	...	...	25	1	6	8
9812	33*b*	...	...	...	21	...	...	...	...	...	...	...	...	...	...	1	5	13	...	19	1	6	2
9813	33*c*	...	...	...	21	...	...	...	...	...	...	...	...	3	3	1	2	10	2	1	1	7	12
9814	38	1	5	15.00	39	4	2	1	1	10	...	...	...	...	...	...	...	...	2	12	1	7	23
9815	38*a*	...	...	...	39	...	...	...	...	...	1	5	11	...	...	...	...	...	...	24	1	6	6
9816	38*b*	...	...	...	39	...	...	...	...	...	...	...	...	...	...	1	5	11	1	21	1	7	8
9817	38*c*	...	...	...	39	...	...	...	...	...	...	...	...	3	2	1	2	10	1	2	1	6	15

CONCRETE CUBES MADE OF THOS. MILLEM & SON'S "WAYLAND" BRAND OF CEMENT—Continued.

No. of test.	Marks.	Composition.			In mold.	In water.		Buried in sand.			In cool cellar.			In open air covered with sacking, and wet with water several times a day.		Out of doors, exposed to weather.			Under cover in dry place.		Age when tested.		
		Cement.	Sand.	Broken stone.	*Hours.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*
9818	43	1	5	15.20	23	4	1	1	1	10									3	12	1	8	24
9819	43*a*				23						1	5	10						2	0	1	7	11
9820	43*b*				23											1	5	10	1	21	1	7	4
9821	43*c*				23									3	1	1	2	10	1	7	1	6	18
9822	44	1	1	5.11	23	4	0	1	1	10									3	5	1	8	16
9823	44*a*				23						1	5	9							25	1	6	4
9824	44*b*				23											1	5	9	1	14	1	6	24
9825	44*c*				23									3	0	1	2	10	1	8	1	6	18
9826	49	1	1	4.12	45	3	28	1	1	10									3	23	1	9	3
9827	49*a*				45						1	5	7						1	26	1	7	7
9828	49*b*				45											1	5	7	1	13	1	6	22
9829	49*c*				45									2	28	1	2	10	1	7	1	6	16
9830	54	1	1	4.37	39	3	25	1	1	10									3	14	1	8	21
9831	54*a*				39						1	5	4						2	0	1	7	6
9832	54*b*				39											1	5	4	1	14	1	6	20
9833	54*c*				39									2	25	1	2	10	1	8	1	6	14
9834	45	1	2	7.62	19	4	0	1	1	10									3	5	1	8	16
9835	45*a*				19															22	1	6	1
9836	45*b*				19						1	5	9			1	5	9	1	13	1	6	23
9837	45*c*				19									3	0	1	2	10	1	8	1	6	18
9838	50	1	2	6.43	18	3	27	1	1	10									3	12	1	8	20
9839	50*a*				18						1	5	6						1	26	1	7	5
9840	50*b*				18											1	5	6	1	14	1	6	21
9841	50*c*				18									2	27	1	2	10	1	7	1	6	14
9842	55	1	2	6.43	21	3	25	1	1	10									3	21	1	8	27
9843	55*a*				21						1	5	4						1	26	1	7	3
9844	55*b*				21											1	5	4	1	22	1	6	27
9845	55*c*				21									2	25	1	2	10	1	7	1	6	12
9846	46	1	3	8.18	16	4	0	1	1	10									8	12	1	8	23
9847	46*a*				16						1	5	9							25	1	6	4
9848	46*b*				16											1	5	9	1	21	1	7	0
9849	46*c*				16									3	0	1	2	10		29	1	6	9

9850	51	1	3	8.29	15	3	27	1	1	10	.....	.....	.....	.....	.....	.....	.....	.....	3	9	1	8	17
9851	51*a*	.....	.....	.....	15	.....	.....	.....	.....	.....	1	5	6	.....	.....	.....	.....	.....	1	26	1	7	3
9852	51*b*	.....	.....	.....	15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	5	6	1	21	1	6	28
9853	51*c*	.....	.....	.....	15	.....	.....	.....	.....	.....	.....	.....	.....	2	27	1	2	10	1	4	1	6	11
9854	56	1	3	8.34	48	3	24	1	1	10	.....	.....	.....	.....	.....	.....	.....	.....	2	12	1	7	18
9855	56*a*	.....	.....	.....	48	.....	.....	.....	.....	.....	1	5	3	.....	.....	.....	.....	.....	1	26	1	7	2
9856	56*b*	.....	.....	.....	48	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	5	3	1	21	1	6	26
9857	56*c*	.....	.....	.....	48	.....	.....	.....	.....	.....	.....	.....	.....	2	24	1	2	10	.....	29	1	6	3
9858	47	1	4	10.71	51	3	28	1	1	10	.....	.....	.....	.....	.....	.....	.....	.....	3	12	1	8	22
9859	47*a*	.....	.....	.....	51	.....	.....	.....	.....	.....	1	5	7	.....	.....	.....	.....	.....	.....	24	1	6	2
9860	47*b*	.....	.....	.....	51	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	5	7	1	13	1	6	22
9861	47*c*	.....	.....	.....	51	.....	.....	.....	.....	.....	.....	.....	.....	2	28	1	2	10	1	1	1	6	10
9862	52	1	4	10.97	29	3	26	1	1	10	.....	.....	.....	.....	.....	.....	.....	.....	3	15	1	8	22
9863	52*a*	.....	.....	.....	29	.....	.....	.....	.....	.....	1	5	5	.....	.....	.....	.....	.....	1	26	1	7	4
9864	52*b*	.....	.....	.....	29	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	5	5	1	9	1	6	15
9865	52*c*	.....	.....	.....	29	.....	.....	.....	.....	.....	.....	.....	.....	2	26	1	2	10	1	22	1	7	0
9866	57	1	4	10.97	45	3	24	1	1	10	.....	.....	.....	.....	.....	.....	.....	.....	3	18	1	8	24
9867	57*a*	.....	.....	.....	45	.....	.....	.....	.....	.....	1	5	3	.....	.....	.....	.....	.....	1	26	1	7	3
9868	57*b*	.....	.....	.....	45	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	5	3	.....	22	1	5	27
9869	57*c*	.....	.....	.....	45	.....	.....	.....	.....	.....	.....	.....	.....	2	24	1	2	10	.....	29	1	6	3
9870	48	1	5	11.25	47	3	28	1	1	10	.....	.....	.....	.....	.....	.....	.....	.....	3	12	1	8	32
9871	48*a*	.....	.....	.....	47	.....	.....	.....	.....	.....	1	5	7			.....	.....	.....	.....	24	1	6	2
9872	48*b*	.....	.....	.....	47	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	5	7	1	21	1	7	2
9873	48*c*	.....	.....	.....	47	.....	.....	.....	.....	.....	.....	.....	.....	2	28	1	2	10	1	8	1	6	17
9874	53	1	5	12.50	24	3	26	1	1	10	.....	.....	.....	.....	.....	.....	.....	.....	3	28	1	9	5
9875	53*a*	.....	.....	.....	24	.....	.....	.....	.....	.....	1	5	5	.....	.....	.....	.....	.....	2	1	1	7	7
9876	53*b*	.....	.....	.....	24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	5	5	1	13	1	6	19
9877	53*c*	.....	.....	.....	24	.....	.....	.....	.....	.....	.....	.....	.....	2	26	1	2	10	1	4	1	6	10
9878	58	1	5	12.90	27	3	24	1	1	10	.....	.....	.....	.....	.....	.....	.....	.....	3	18	1	8	23
9879	58*a*	.....	.....	.....	27	.....	.....	.....	.....	.....	1	5	3	.....	.....	.....	.....	.....	1	26	1	7	2
9880	58*b*	.....	.....	.....	27	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	5	3	.....	19	1	5	23
9881	58*c*	.....	.....	.....	27	.....	.....	.....	.....	.....	.....	.....	.....	2	24	1	2	10	1	26	1	7	2

CONCRETE CUBES MADE OF THE GLENS FALLS PORTLAND CEMENT COMPANY'S "IRONCLAD" BRAND OF CEMENT.

No. of test.	Marks.	Composition.			In mold.	In water.		Buried in sand.			In cool cellar.			In open air covered with sacking, and wet with water several times a day.		Out of doors, exposed to weather.			Under cover in dry place.		Age when tested.		
		Cement.	Sand.	Broken stone.	*Hours.*	*Mos.*	*Days.*	*Yrs.*	*Mcs.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*
9882	59	1	2	8.04	48	3	23	1	1	10									3	23	1	8	28
9883	59*a*				48						1	5	2						1	26	1	7	2
9884	59*b*				48											1	5	2	1	23	1	6	27
9885	59*c*				48									2	23	1	2	10	1	2	1	6	6
9886	62	1	2	7.76	24	3	23	1	1	10									2	11	1	7	14
9887	62*a*				24						1	5	2							26	1	5	29
9888	62*b*				24											1	5	2	1	14	1	6	17
9889	62*c*				24									2	23	1	2	10	1	7	1	6	10
9890	65	1	2	7.25	41	3	21	1	1	10									3	28	1	9	1
9891	65*a*				41						1	5	0						1	1	1	6	3
9892	65*b*				41											1	5	0	1	21	1	6	23
9893	65*c*				41									2	21	1	2	10	1	2	1	6	4
9894	60	1	3	9.78	45	3	23	1	1	10									3	18	1	8	23
9895	60*a*				45						1	5	2						1	26	1	7	2
9896	60*b*				45											1	5	2		21	1	5	25
9897	60*c*				45									2	23	1	2	10	1	4	1	6	8
9898	63	1	3	10.00	63	3	21	1	1	10									3	19	1	8	23
9899	63*a*				63						1	5	0						1	0	1	6	3
9900	63*b*				63											1	5	0	1	22	1	6	25
9901	63*c*				63									2	21	1	2	10	1	1	1	6	4
9902	66	1	3	10.23	63	3	20	1	1	10									2	11	1	7	14
9903	66*a*				63						1	4	30						1	0	1	6	2
9904	66*b*				63											1	4	30	1	22	1	6	24
9905	66*c*				63									2	20	1	2	10	1	21	1	6	23
9906	61	1	4	12.85	27	3	23	1	1	10									3	19	1	8	23
9907	61*a*				27						1	5	2						1	1	1	6	4
9908	61*b*				27											1	5	2		19	1	5	22
9909	61*c*				27									2	23	1	2	10		21	1	5	24
9910	64	1	4	12.85	45	3	21	1	1	10									3	21	1	8	24
9911	64*a*				45						1	5	0							25	1	5	27
9912	64*b*				45											1	5	0	1	21	1	6	23
9913	64*c*				45									2	21	1	2	10		29	1	6	0

9914	67	1	4	15.00	45	3	19	1	1	10									3	24	1	8	25
9915	67*a*				45						1	4	29							26	1	5	26
9916	67*b*				45											1	4	29	1	21	1	6	21
9917	67*c*				45									2	19	1	2	10	1	8	1	6	8
9918	68	1	2	6.25	42	3	19	1	1	10									3	29	1	9	0
9919	68*a*				42						1	4	29							23	1	5	23
9920	68*b*				42											1	4	29	1	22	1	6	22
9921	68*c*				42									2	19	1	2	10	1	4	1	6	4
9922	71	1	2	6.71	45	3	18	1	1	10									3	12	1	8	12
9923	71*a*				45						1	4	28						1	1	1	6	0
9924	71*b*				45											1	4	28	1	28	1	6	22
9925	71*c*				45									2	18	1	2	10		29	1	5	28
9926	74	1	2	6.51	45	3	17	1	1	10									3	15	1	8	14
9927	74*a*				45						1	4	27							22	1	5	20
9928	74*b*				45											1	4	27	1	23	1	6	21
9929	74*c*				45									2	17	1	2	10	1	7	1	6	5
9930	69	1	3	8.32	39	3	19	1	1	10									3	16	1	8	17
9931	69*a*				39						1	4	29							25	1	5	25
9932	69*b*				39											1	4	29	1	14	1	6	14
9933	69*c*				39									2	19	1	2	10	1	9	1	6	9
9934	72	1	3	8.38	51	3	17	1	1	10									3	15	1	8	14
9935	72*a*				51						1	4	27							25	1	5	23
9936	72*b*				51											1	4	27	1	13	1	6	11
9937	72*c*				51									2	17	1	2	10	1	2	1	6	0
9938	75	1	3	8.50	51	3	16	1	1	10									3	23	1	8	21
9939	75*a*				51						1	4	26							23	1	5	20
9940	75*b*				51											1	4	26	1	14	1	6	11
9941	75*c*				51									2	16	1	2	10	1	8	1	6	5
9942	70	1	4	10.46	48	3	18	1	1	10									3	18	1	8	18
9943	70*a*				48						1	4	28						1	2	1	6	1
9944	70*b*				48											1	4	28	1	13	1	6	12
9945	70*c*				48									2	18	1	2	10	1	8	1	6	7
9946	73	1	4	11.25	47	3	17	1	1	10									3	14	1	8	13
9947	73*a*				47						1	4	27							21	1	5	19
9948	73*b*				47											1	4	27	1	21	1	6	19
9949	73*c*				47									2	17	1	2	10	1	8	1	6	6
9950	76	1	4	11.25	47	3	16	1	1	10									3	10	1	8	8
9951	76*a*				47						1	4	26						1	2	1	5	30
9952	76*b*				47											1	4	26	1	23	1	6	20
9953	76*c*				47									2	16	1	2	10	1	7	1	6	4

CONCRETE CUBES MADE OF THE EMPIRE PORTLAND CEMENT COMPANY'S CEMENT.

No. of test.	Marks.	Composition.			In mold.	In water.		Buried in sand.			In cool cellar.			In open air covered with sacking, and wet with water several times a day.		Out of doors, exposed to weather.			Under cover in dry place.		Age when tested.		
		Cement.	Sand.	Broken stone.	*Hours.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*
9954	77	1	2	7.50	45	3	16	1	1	10									3	16	1	8	14
9955	77*a*				45						1	4	26							29	1	5	26
9956	77*b*				45											1	4	26	1	9	1	6	6
9957	77*c*				45									2	16	1	2	10	1	21	1	6	18
9958	80	1	2	6.71	69	3	14	1	1	10									3	10	1	8	7
9959	80*a*				69						1	4	24						1	21	1	6	17
9960	80*b*				69											1	4	24	1	21	1	6	17
9961	80*c*				69									2	14	1	2	10	1	7	1	6	3
9962	83	1	2	7.50	69	3	13	1	1	10									3	9	1	8	5
9963	83*a*				69						1	4	23							22	1	5	17
9964	83*b*				69											1	4	23		23	1	5	18
9965	83*c*				69									2	13	1	2	10	2	2	1	6	28
9966	78	1	3	9.78	75	3	14	1	1	10									3	24	1	8	21
9967	78*a*				75						1	4	24							29	1	5	25
9968	78*b*				75											1	4	24	1	14	1	6	10
9969	78*c*				75									2	14	1	2	10	1	4	1	6	0
9970	81	1	3	10.23	75	3	13	1	1	10									3	10	1	8	6
9971	81*a*				75						1	4	23						1	21	1	6	16
9972	81*b*				75											1	4	23	1	21	1	6	16
9973	81*c*				75									2	13	1	2	10		29	1	5	24
9974	84	1	3	10.23	69	3	11	1	1	10									3	16	1	8	10
9975	84*a*				69						1	4	21						1	21	1	6	14
9976	84*b*				69											1	4	21	1	23	1	6	16
9977	84*c*				69									2	11	1	2	10	1	2	1	5	26
9978	79	1	4	12.85	71	3	14	1	1	10									3	22	1	8	19
9979	79*a*				71						1	4	24						1	21	1	6	17
9980	79*b*				71											1	4	24	1	13	1	6	9
9981	79*c*				71									2	14	1	2	10	1	8	1	6	4
9982	82	1	4	13.24	71	3	13	1	1	10									3	10	1	8	6
9983	82*a*				71						1	4	23						1	23	1	6	18
9984	82*b*				71											1	4	23		21	1	5	16
9985	82*c*				71									2	13	1	2	10		28	1	5	23

9986	85	1	4	13.24	65	3	11	1	1	10									3	29	1	8	23
9987	85*a*				65						1	4	21						1	29	1	6	22
9988	85*b*				65											1	4	21		22	1	5	15
9989	85*c*				65									2	11	1	2	10	1	4	1	5	28
9990	86	1	2	6.33	63	3	11	1	1	10									3	22	1	8	16
9991	86*a*				63						1	4	21						1	29	1	6	22
9992	86*b*				63											1	4	21		19	1	5	12
9993	86*c*				63									2	11	1	2	10		22	1	5	15
9994	89	1	2	6.43	63	3	10	1	1	10									3	22	1	8	15
9995	89*a*				63						1	4	20							22	1	5	14
9996	89*b*				63											1	4	20	1	21	1	6	13
9997	89*c*				63									2	10	1	2	10		29	1	5	21
9998	92	1	2	6.43	63	3	9	1	1	10									3	24	1	8	16
9999	92*a*				63						1	4	19						2	1	1	6	23
10000	92*b*				63											1	4	19	1	21	1	6	12
10001	92*c*				63									2	9	1	2	10	1	8	1	5	30
10002	87	1	3	8.03	69	3	10	1	1	10									3	24	1	8	17
10003	87*a*				69						1	4	20							22	1	5	14
10004	87*b*				69											1	4	20	1	13	1	6	5
10005	87*c*				69									2	10	1	2	10	1	7	1	5	30
10006	90	1	3	8.33	69	3	9	1	1	10									3	29	1	8	21
10007	90*a*				69						1	4	19							21	1	5	12
10008	90*b*				69											1	4	19	1	22	1	6	13
10009	90*c*				69									2	9	1	2	10	1	2	1	5	24
10010	93	1	3	8.58	93	3	7	1	1	10									3	23	1	8	14
10011	93*a*				93						1	4	17						2	1	1	6	22
10012	93*b*				93											1	4	17	1	21	1	6	11
10013	93*c*				93									2	7	1	2	10	1	7	1	5	28
10014	88	1	4	10.71	65	3	10	1	1	10									3	21	1	8	14
10015	88*a*				65						1	4	20							22	1	5	14
10016	88*b*				65											1	4	20	1	22	1	6	14
10017	88*c*				65									2	10	1	2	10	1	1	1	5	24
10018	91	1	4	10.71	66	3	9	1	1	10									3	28	1	8	20
10019	91*a*				66						1	4	19						2	0	1	6	22
10020	91*b*				66											1	4	19	1	21	1	6	12
10021	91*c*				66									2	9	1	2	10	1	21	1	6	12
10022	94	1	4	10.97	89	3	7	1	1	10									3	23	1	8	14
10023	94*a*				89						1	4	17						2	0	1	6	21
10024	94*b*				89											1	4	17	1	14	1	6	4
10025	94*c*				89									2	7	1	2	10	1	9	1	5	30

CONCRETE CUBES MADE OF THE SAND-SILICA CEMENT COMPANY'S CHAMPION BRAND OF CEMENT.

No. of test.	Marks.	Composition.			In mold.	In water.		Buried in sand.			In cool cellar.			In open air covered with sacking, and wet with water several times a day.		Out of doors exposed to weather.			Under cover in dry place.		Age when tested.		
		Cement.	Sand.	Broken stone.	*Hours.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*
10026	95	1	1	5.00	87	3	7	1	1	10									3	18	1	8	9
10027	95*a*				87						1	4	17						1	23	1	6	13
10028	95*b*				87											1	4	17	1	13	1	6	3
10029	95*c*				87									2	7	1	2	10	1	8	1	5	29
10030	98	1	1	4.79	87	3	6	1	1	10									3	18	1	8	8
10031	98*a*				87						1	4	16						2	0	1	6	20
10032	98*b*				87											1	4	16	1	22	1	6	11
10033	98*c*				87									2	6	1	2	10	1	7	1	5	27
10034	101	1	1	5.11	87	3	5	1	1	10									3	18	1	8	7
10035	101*a*				87						1	4	15						1	23	1	6	11
10036	101*b*				87											1	4	15	1	21	1	6	9
10037	101*c*				87									2	5	1	2	10	1	7	1	5	26
10038	96	1	2	7.14	93	3	6	1	1	10									3	29	1	8	19
10039	96*a*				93						1	4	16						1	23	1	6	12
10040	96*b*				93											1	4	16	1	23	1	6	12
10041	96*c*				93									2	6	1	2	10		29	1	5	18
10042	99	1	2	7.25	93	3	5	1	1	10									3	24	1	8	13
10043	99*a*				93						1	4	15						2	1	1	6	20
10044	99*b*				93											1	4	15	1	22	1	6	11
10045	99*c*				93									2	5	1	2	10	1	8	1	5	27
10046	102	1	2	6.92	69	8	4	1	1	10									3	18	1	8	5
10047	102*a*				69						1	4	14						2	0	1	6	17
10048	102*b*				69											1	4	14	1	22	1	6	9
10049	102*c*				69									2	4	1	2	10	1	21	1	6	7
10050	97	1	3	9.59	89	3	6	1	1	10									3	22	1	8	12
10051	97*a*				89						1	4	16						2	1	1	6	21
10052	97*b*				89											1	4	16	1	11	1	6	0
10053	97*c*				89									2	6	1	2	10	1	2	1	5	22
10054	100	1	3	9.78	89	3	5	1	1	10									3	19	1	8	8
10055	100*a*				89						1	4	15						1	23	1	6	11
10056	100*b*				89											1	4	15	1	21	1	6	9
10057	100*c*				89									2	5	1	2	10	1	7	1	5	26

10058	103	1	3	9.00	65	3	4	1	1	10									3	15	1	8	2
10059	103*a*				65						1	4	14							25	1	5	11
10060	103*b*				65											1	4	14	1	21	1	6	7
10061	103*c*				65									2	4	1	2	10	1	7	1	5	24
10062	104	1	1	3.90	63	3	4	1	1	10									3	15	1	8	2
10063	104*a*				63						1	4	14							26	1	5	12
10064	104*b*				63											1	4	14	1	14	1	6	
10065	104*c*				63									2	4	1	2	10	1	8	1	5	25
10066	107	1	1	4.16	63	3	3	1	1	10									2	10	1	6	26
10067	107*a*				63						1	4	13						1	1	1	5	17
10068	107*b*				63											1	4	13		19	1	5	4
10069	107*c*				63									2	3	1	2	10		29	1	5	14
10070	110	1	1	4.20	63	3	2	1	1	10									3	15	1	8	0
10071	110*a*				63						1	4	12							23	1	5	7
10072	110*b*				63											1	4	12		24	1	5	8
10073	110*c*				63									2	2	1	2	10	1	4	1	5	19
10074	105	1	2	5.18	69	3	3	1	1	10									2	10	1	6	26
10075	105*a*				69						1	4	13							23	1	5	8
10076	105*b*				69											1	4	13	1	21	1	6	6
10077	105*c*				69									2	3	1	2	10	1	7	1	5	23
10078	108	1	2	6.08	69	3	2	1	1	10									3	16	1	8	1
10079	108*a*				69						1	4	12							29	1	5	13
10080	108*b*				69											1	4	12		21	1	5	5
10081	108*c*				69									2	2	1	2	10	2	1	1	6	16
10082	111	1	2	6.18	93	3	1	1	1	10									3	16	1	8	0
10083	111*a*				93						1	4	10						2	1	1	6	15
10084	111*b*				93											1	4	10		19	1	5	2
10085	111*c*				93									2	1	1	2	10		21	1	5	5
10086	106	1	3	8.03	66	3	4	1	1	10									2	10	1	6	27
10087	106*a*				66						1	4	13							25	1	5	10
10088	106*b*				66											1	4	13	1	21	1	6	6
10089	106*c*				66									2	3	1	2	10		29	1	5	14
10090	109	1	3	8.18	65	3	3	1	1	10									3	14	1	7	30
10091	109*a*				65						1	4	12							22	1	5	6
10092	109*b*				65											1	4	12	1	21	1	6	5
10093	109*c*				65									2	2	1	2	10	1	2	1	5	17
10094	112	1	3	8.65	89	3	1	1	1	10									3	16	1	8	0
10095	112*a*				89						1	4	10						2	1	1	6	15
10096	112*b*				89											1	4	10	1	13	1	5	27
10097	112*c*				89									2	1	1	2	10	1	7	1	5	22

CONCRETE CUBES MADE FROM BUFFALO "PORTLAND" CEMENT, SO CALLED, A SELECTED NATURAL CLINKER.

No. of test.	Marks.	Composition.			In mold.	In water.		Buried in sand.			In cool cellar.			In open air covered with sacking, and wet with water several times a day.		Out of doors exposed to weather.			Under cover in dry place.		Age when tested.		
		Cement.	Sand.	Broken stone.																			
					Hours.	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*
10098	113	1	2	6.43	87	3	1	1	1	10									3	9	1	7	24
10099	113*a*				87						1	4	10							23	1	5	6
10100	113*c*				87									2	1	1	2	10	1	1	1	5	16
10102	114*a*	1	3	8.18	93						1	4	9							23	1	5	5
10104	114*c*				93									2	0	1	2	10		20	1	5	12
MORTAR CUBES MADE OF BUFFALO "PORTLAND" CEMENT.																							
10105	115	1	2	None ...	80	3	0	1	1	10									3	12	1	7	26
10106	115*a*				89						1	4	9						2	1	1	6	14
10107	115*b*				89											1	4	9	1	23	1	6	5
10108	116*c*				89									2	0	1	2	10	1	2	1	5	16
MORTAR CUBES MADE OF BUFFALO NATURAL CEMENT.																							
10109	116	1	1	None ...	93	2	29	1	1	10									3	10	1	7	23
10110	116*a*				93						1	4	8						2	1	1	6	13
10111	116*b*				93											1	4	8	1	21	1	6	3
10112	116*c*				93									1	29	1	2	10	1	24	1	6	6
10113	119	1	1	None ...	60	2	28	1	1	10									3	14	1	7	25
10114	119*a*				69						1	4	7						2	2	1	6	12
10115	119*b*				69											1	4	7	1	24	1	6	3
10116	119*c*				69									1	28	1	2	10	1	9	1	5	19
10117	122	1	1	None ...	69	2	27	1	1	10									2	10	1	6	20
10118	122*a*				69						1	4	6						2	1	1	6	10
10119	122*b*				69											1	4	6	1	13	1	5	22
10120	122*c*				69									1	27	1	2	10	1	1	1	5	10
10121	117	1	2	None ...	89	2	29	1	1	10									3	12	1	7	25
10122	117*a*				89						1	4	8						2	0	1	6	12
10123	117*b*				89											1	4	8	1	14	1	5	26

10125	120	1	2	None ...	65	2	28	1	1	10									3	12	1	7	23
10126	120*a*				65						1	4	7						2	2	1	6	12
10127	120*b*				65											1	4	7	1	14	1	5	24
10128	120*c*				65									1	28	1	2	10	1	9	1	5	19
10129	123	1	2	None ...	65	2	27	1	1	10									3	15	1	7	25
10130	123*a*				65						1	4	6						2	1	1	6	10
10131	123*b*				65											1	4	6	1	22	1	6	3
10132	123*c*				65									1	27	1	2	10	1	7	1	5	16
10133	118	1	3	None ...	87	2	29	1	1	10									3	12	1	7	25
10134	118*a*				87						1	4	8						1	26	1	6	8
10135	118*b*				87											1	4	8	1	22	1	6	4
10136	118*c*				87									1	29	1	2	10	1	13	1	5	25
10137	121	1	3	None ...	63	2	28	1	1	10									3	0	1	7	11
10138	121*a*				63						1	4	7						2	1	1	6	11
10139	121*b*				63											1	4	7	1	22	1	6	4
10140	121*c*				63									1	28	1	2	10		28	1	5	7
10141	124	1	3	None ...	63	2	27	1	1	10									3	0	1	7	10
10142	124*a*				63						1	4	6						2	1	1	6	10
10143	124*b*				63											1	4	6	1	22	1	6	3
10144	124*c*				63									1	27	1	2	10	1	8	1	5	17

MORTAR CUBES MADE OF THE EMPIRE PORTLAND CEMENT COMPANY'S CEMENT.

10145	125	1	2	None ...	69	2	26	1	1	10									3	9	1	7	18
10146	125*a*				69						1	4	5						2	2	1	6	10
10147	125*b*				69											1	4	5	1	21	1	6	1
10148	125*c*				69									1	26	1	2	10	1	8	1	5	16
10149	128	1	2	None ...	93	2	24	1	1	10									3	14	1	7	22
10150	128*a*				93						1	4	3						2	0	1	6	7
10151	128*b*				93											1	4	3	1	21	1	6	0
10152	128*c*				93									1	24	1	2	10	1	7	1	5	14
10153	126	1	3	None ...	65	2	26	1	1	10									3	9	1	7	18
10154	126*a*				65						1	4	5						2	1	1	6	9
10155	126*b*				65											1	4	5	1	21	1	6	1
10156	126*c*				65									1	26	1	2	10	1	7	1	5	15
10157	129	1	3	None ...	89	2	24	1	1	10										22	1	4	29
10158	129*a*				89						1	4	3						2	1	1	6	8
10159	129*b*				89											1	4	3	1	14	1	5	21
10160	129*c*				89									1	24	1	2	10	1	8	1	5	15

MORTAR CUBES MADE OF THE EMPIRE PORTLAND CEMENT COMPANY'S CEMENT—Continued.

No. of test.	Marks.	Composition.			In mold.	In water.		Buried in sand.			In cool cellar.			In open air covered with sacking, and wet with water several times a day.		Out of doors, exposed to weather.			Under cover in dry place.		Age when tested.		
		Cement.	Sand.	Broken stone.	*Hours.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*
10161	127	1	4	None ...	63	2	26	1	1	10	......	......	......	......	......	......	......	......	3	21	1	8	0
10162	127*a*	......	......	......	63	......	......	......	......	......	1	4	5	......	......	......	......	......	2	1	1	6	9
10163	127*b*	......	......	......	63	......	......	......	......	......	......	......	......	......	......	1	4	5	1	21	1	6	1
10164	127*c*	......	......	......	63	......	......	......	......	......	......	......	......	1	26	1	2	10	......	19	1	4	27
10165	130	1	4	None ...	87	2	24	1	1	10	......	......	......	......	......	......	......	......	3	14	1	7	22
10166	130*a*	......	......	......	87	......	......	......	......	......	1	4	3	......	......	......	......	......	2	1	1	6	8
10167	130*b*	......	......	......	87	......	......	......	......	......	......	......	......	......	......	1	4	3	......	19	1	4	26
10168	130*c*	......	......	......	87	......	......	......	......	......	......	......	......	1	24	1	2	10	1	4	1	5	11

MORTAR CUBES MADE OF THE GLENS FALLS PORTLAND CEMENT COMPANY'S "IRONCLAD" BRAND OF CEMENT.

No. of test.	Marks.	Cement.	Sand.	Broken stone.	*Hours.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*
10169	134	1	2	None ...	69	2	24	1	1	10	......	......	......	......	......	......	......	......	3	14	1	7	21
10170	134*a*	......	......	......	69	......	......	......	......	......	1	4	3	......	......	......	......	......	2	0	1	6	6
10171	134*b*	......	......	......	69	......	......	......	......	......	......	......	......	......	......	1	4	3	1	21	1	5	27
10172	134*c*	......	......	......	69	......	......	......	......	......	......	......	......	1	24	1	2	10	1	1	1	5	7
10173	135	1	3	None ...	65	2	24	1	1	10	......	......	......	......	......	......	......	......	3	16	1	7	23
10174	135*a*	......	......	......	65	......	......	......	......	......	1	4	3	......	......	......	......	......	2	1	1	6	7
10175	135*b*	......	......	......	65	......	......	......	......	......	......	......	......	......	......	1	4	3	......	21	1	4	27
10176	135*c*	......	......	......	65	......	......	......	......	......	......	......	......	1	24	1	2	10	1	4	1	5	10
10177	136	1	4	None ...	63	2	24	1	1	10	......	......	......	......	......	......	......	......	3	16	1	7	28
10178	136*a*	......	......	......	63	......	......	......	......	......	1	4	3	......	......	......	......	......	1	23	1	6	1
10179	136*b*	......	......	......	63	......	......	......	......	......	......	......	......	......	......	1	4	3	......	22	1	4	28
10180	136*c*	......	......	......	63	......	......	......	......	......	......	......	......	1	24	1	2	10	......	21	1	4	27

MORTAR CUBES MADE OF THE SAND-SILICA CEMENT COMPANY'S "CHAMPION" BRAND OF CEMENT.

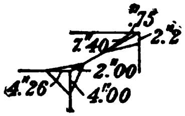
No. of test.	Marks.	Cement.	Sand.	Broken stone.	*Hours.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*	*Mos.*	*Days.*	*Yrs.*	*Mos.*	*Days.*
10181	143	1	1	None ...	45	2	24	1	1	10	......	......	......	......	......	......	......	......	3	0	1	7	6
10182	143*a*	......	......	......	45	......	......	......	......	......	1	4	3	......	......	......	......	......	2	1	1	6	6
10183	143*b*	......	......	......	45	......	......	......	......	......	......	......	......	......	......	1	4	3	1	22	1	5	27
10184	143*c*	......	......	......	45	......	......	......	......	......	......	......	......	1	24	1	2	10	1	9	1	5	14

10185	144	1	2	None	41	2	24	1	1	10									3	0	1	7	6
10186	144*a*				41						1	4	3						2	0	1	6	5
10187	144*b*				41											1	4	3	1	21	1	5	26
10188	144*c*				41									1	24	1	2	10	1	9	1	5	14
10189	145	1	3	None	39	2	24	1	1	10									3	1	1	7	7
10190	145*a*				39						1	4	3						2	1	1	6	6
10191	145*b*				39											1	4	3	1	14	1	5	19
10192	145*c*				39									1	24	1	2	10	1	9	1	5	14

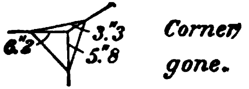
TABLE NO. 2.

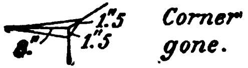
CONCRETE CUBES MADE OF THE WAYLAND PORTLAND CEMENT COMPANY'S "GENESEE" BRAND OF CEMENT.

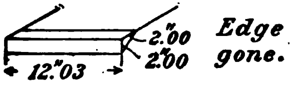
Mortar, 33 per cent of broken stone.

No. of test.	Marks.	Age when tested.			Composition.			Consistency of mortar.	Weight per cubic foot.	Dimensions.			Sectional area.	First crack.	Ultimate strength.		Remarks.
					Cement.	Sand.	Broken stone.			Height.	Compressed surface.				Total.	Per square inch.	
		Yrs.	*Mos.*	*Days.*					*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. in.*	*Pounds.*	*Pounds.*	*Pounds.*	
9650	7	1	9	4	1	1	4.71	Dry.....	147.16	12.13	12.00	12.02	144.24	461,500	672,000	4,659	
9651	7*a*	1	6	24	......	......	......	....	145.05	12.13	11.99	12.00	143.88	250,000	583,400	4,055	
9652	7*b*	1	6	17	......	......	......	....	146.90	12.10	12.01	12.06	144.84	314,000	517,000	3,570	
9653	7*c*	1	6	25	......	......	......	....	147.43	12.24	12.00	12.01	144.12	369,000	610,500	4,236	
9654	12	1	9	14	1	1	5.25	Plastic..	147.54	12.19	12.00	12.01	144.12	430,000	547,656	3,800	
9655	12*a*	1	6	15	......	......	......	....	144.48	12.24	11.98	12.01	143.88	298,000	494,800	3,439	
9656	12*b*	1	7	8	......	......	......	....	146.55	12.18	12.00	12.00	144.00	316,000	486,000	3,875	
9657	12*c*	1	6	26	......	......	......	....	146.08	12.18	11.99	12.02	144.12	309,000	491,000	3,407	 Corners gone.
9658	16	1	9	14	1	1	4.98	Excess..	148.40	12.22	12.01	12.02	144.36	317,000	548,100	3,797	
9659	16*a*	1	6	21	......	......	......	....	144.31	12.14	11.96	12.00	143.52	252,000	480,100	3,345	
9660	16*b*	1	7	14	......	......	......	....	147.65	12.14	12.00	12.01	144.12	263,000	531,000	3,684	
9661	16*c*	1	7	1	......	......	......	....	146.14	12.03	12.01	11.99	144.00	354,000	527,100	3,660	
9662	1	1	9	26	1	2	7.14	Dry.....	140.73	12.10	12.02	12.03	144.60	375,900	532,100	3,680	
9663	1*a*	1	7	1	......	......	......	....	139.40	12.01	12.01	12.01	144.24	299,000	507,000	3,515	
9664	1*b*	1	7	22	......	......	......	....	138.49	12.08	12.03	12.02	144.60	241,000	317,600	2,196	
9665	1*c*	1	7	4	......	......	......	....	137.68	12.00	12.03	12.02	144.60	255,000	292,000	2,019	
9666	17	1	9	15	1	2	6.62	Excess..	145.30	12.09	12.00	12.05	144.60	260,200	419,600	2,902	
9667	17*a*	1	6	14	......	......	......	....	142.93	12.08	12.03	12.00	144.36	201,000	357,600	2,477	
9668	17*b*	1	7	14	......	......	......	....	144.41	12.05	12.01	12.03	144.48	267,000	342,500	2,371	
9669	17*c*	1	6	30	......	......	......	....	145.42	12.04	12.09	12.02	145.32	220,000	341,000	2,346	
9670	8	1	8	7	1	3	8.93	Dry.....	144.16	12.33	12.00	12.01	144.12	310,000	474,000	3,289	
9671	8*a*	1	6	21	......	......	......	....	142.66	12.12	11.94	11.99	143.16	318,000	436,000	3,046	
9672	8*b*	1	6	18	......	......	......	....	142.25	12.20	11.99	12.00	143.88	305,000	386,200	2,684	
9673	8*c*	1	7	28	......	......	......	....	141.70	12.10	12.01	12.00	144.12	432,000	467,000	3,240	

9674	2	1	9	19	1	3	9.80	Plastic..	143.89	12.02	12.08	11.98	144.12	201,700	435,500	3,022
9675	2a	1	7	1	......	......	......	....	142.51	12.04	11.98	12.00	143.76	228,000	353,100	2,456
9676	2b	1	7	23	......	......	......	....	142.79	12.04	12.01	12.01	144.24	254,000	340,000	2,357
9677	2c	1	7	21	......	......	......	....	143.50	12.00	11.99	12.01	144.00	273,000	378,600	2,629
9678	13	1	9	12	1	3	10.14	Plastic..	144.08	12.15	12.00	12.01	144.12	250,000	386,300	2,680
9679	13a	1	6	19	......	......	......	....	141.13	12.34	12.02	12.01	144.36	256,000	295,200	2,045
9680	13b	1	7	16	......	......	......	....	144.07	12.16	12.00	11.98	143.76	308,000	349,000	2,428
9681	13c	1	6	26	......	......	......	....	143.32	12.09	12.04	12.01	144.60	244,000	302,500	2,092
9682	18	1	9	22	1	3	9.78	Excess..	143.61	12.09	12.01	12.12	145.56	232,800	397,100	2,728
9683	18a	1	6	16	......	......	......	....	142.16	12.01	12.00	12.04	144.48	176,000	315,800	2,186
9684	18b	1	7	14	......	......	......	....	143.42	12.03	11.99	12.07	144.72	214,000	286,500	1,980
9685	18c	1	6	30	......	......	......	....	142.47	12.09	12.01	12.07	144.96	218,000	308,500	2,128
9686	9	1	8	6	1	4	12.19	Dry.....	142.43	12.27	12.00	12.01	144.12	230,000	319,900	2,220
9687	9a	1	6	20	......	......	......	....	141.06	12.25	12.00	12.00	144.00	248,000	314,800	2,186
9688	9b	1	7	16	......	......	......	....	141.35	12.18	12.00	11.99	143.88	254,000	280,600	1,950
9689	9c	1	6	28	......	......	......	....	142.43	12.08	12.00	12.01	144.12	263,000	270,700	1,878
9690	14	1	9	10	1	4	12.86	Plastic..	141.97	12.09	12.05	12.01	144.72	173,600	306,800	2,120
9691	14a	1	6	18	......	......	......	....	140.13	12.08	12.09	11.99	144.96	165,000	263,200	1,816
9692	14b	1	7	14	......	......	......	....	143.92	12.06	12.02	12.01	144.36	238,000	307,200	2,128
9693	14c	1	6	22	......	......	......	....	142.33	12.03	12.01	12.10	145.32	188,000	302,400	2,081
9694	3	1	9	1	1	4	11.62	Excess..	142.69	12.06	12.00	12.05	144.60	245,800	370,800	2,564
9695	3a	1	6	28	......	......	......	....	140.85	11.97	12.00	12.10	144.00	194,000	310,200	2,154
9696	3b	1	7	12	......	......	......	....	144.13	12.02	11.99	12.00	143.88	244,000	347,100	2,412
9697	3c	1	7	1	......	......	......	....	144.70	12.11	12.06	12.02	144.96	252,000	367,200	2,533
9698	10	1	8	3	1	5	14.70	Dry.....	139.35	12.10	12.08	11.99	144.24	163,000	253,800	1,760
9699	10a	1	6	21	......	......	......	....	139.23	12.14	11.99	11.98	143.64	200,000	254,900	1,775
9700	10b	1	6	16	......	......	......	....	141.80	12.21	12.00	12.00	144.00	192,000	192,000	1,333
9701	10c	1	7	2	......	......	......	....	141.59	12.12	12.00	12.02	144.24	219,000	257,700	1,787
9702	15	1	9	3	1	5	15.00	Plastic.	142.12	12.16	12.03	12.01	144.48	187,800	287,700	1,991
9703	15a	1	6	25	......	......	......	....	140.38	12.16	11.97	12.03	144.00	168,000	254,200	1,765
9704	15b	1	7	16	......	......	......	....	141.42	12.20	12.00	12.04	144.48	211,000	246,100	1,703
9705	15c	1	6	26	......	......	......	....	141.05	12.20	12.02	12.03	144.60	198,000	252,500	1,746
9706	11	1	9	13	1	6	16.66	Dry	139.24	12.03	12.08	12.00	144.36	142,000	197,100	1,365
9707	11a	1	6	13	......	......	......	....	136.63	12.25	12.02	11.96	143.76	170,000	198,200	1,379
9708	11b	1	6	16	......	......	......	....	140.70	12.11	11.99	11.99	143.76	178,000	192,500	1,339
9709	11c	1	6	15	......	......	......	....	141.59	12.14	12.00	11.98	143.76	210,000	233,800	1,626







CONCRETE CUBES MADE OF THE WAYLAND PORTLAND CEMENT COMPANY'S "GENESEE" BRAND OF CEMENT—Continued.

Mortar, 40 per cent of broken stone.

No. of test.	Marks.	Age when tested.			Composition.			Consistency of mortar.	Weight per cubic foot.	Dimensions.			Sectional area.	First crack.	Ultimate strength.		Remarks.
					Cement.	Sand.	Broken stone.			Height.	Compressed surface.				Total.	Per square inch.	
		Yrs.	*Mos.*	*Days.*					*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. in.*	*Pounds.*	*Pounds.*	*Pounds.*	
9710	25	1	9	10	1	1	4.16	Excess	146.45	12.23	12.18	12.02	146.40	401,000	539,400	3,684	
9711	25*a*	1	6	16					143.46	12.17	12.00	11.98	143.76	200,000	427,800	2,976	
9712	25*b*	1	7	2					145.95	12.22	11.99	12.04	144.36	303,000	439,100	3,042	
9713	25*c*	1	6	26					146.40	12.05	11.98	12.08	144.72	297,000	443,000	3,061	
9714	4	1	9	3	1	2	6.17	Dry	144.14	12.04	12.01	12.00	144.12	345,800	515,200	3,575	
9715	4*a*	1	6	28					140.81	12.11	11.97	12.00	143.64	365,000	417,000	2,903	
9716	4*b*	1	7	10					142.43	12.07	12.01	12.01	144.24	385,000	392,000	2,718	
9717	4*c*	1	7	5					144.26	12.01	12.01	12.02	144.36	464,000	483,500	3,349	
9718	19	1	9	5	1	2	6.43	Dry	142.62	12.19	12.01	12.00	144.12	345,800	486,000	3,372	
9719	19*a*	1	6	15					142.19	12.18	12.00	12.01	144.12	331,000	376,800	2,614	
9720	19*b*	1	7	11					145.90	12.04	11.99	12.06	144.60	311,000	455,000	3,147	
9721	19*c*	1	6	29					144.17	12.07	11.99	12.05	144.48	312,000	407,000	2,817	
9722	22	1	9	9	1	2	5.62	Plastic	144.57	12.07	12.01	12.08	145.08	375,000	493,272	3,400	
9723	22*a*	1	6	20					142.52	12.22	12.05	11.98	144.36	299,000	433,100	3,000	
9724	22*b*	1	7	2					142.53	12.06	11.98	12.00	143.76	350,000	392,000	2,727	
9725	22*c*	1	6	21					144.08	12.15	12.04	11.99	144.36	338,000	392,500	2,719	
9726	26	1	8	20	1	2	6.82	Excess	144.60	12.19	12.01	12.02	144.36	259,800	394,000	2,729	
9727	26*a*	1	6	11					143.35	12.20	11.99	11.99	143.76	198,000	324,700	2,259	
9728	26*b*	1	7	8					145.70	12.22	12.00	11.99	143.88	287,000	353,000	2,453	
9729	26*c*	1	6	25					143.97	12.18	12.00	12.01	144.12	268,000	394,200	2,735	
9730	5	1	9	26	1	3	8.12	Dry	144.32	12.17	12.01	11.96	143.64	258,500	411,400	2,864	
9731	5*a*	1	6	16					140.18	12.07	12.00	12.00	144.00	184,000	296,800	2,058	
9732	5*b*	1	7	18					143.86	12.20	12.00	12.02	144.24	297,000	354,700	2,459	
9733	5*c*	1	7	1					143.54	12.08	12.00	12.00	144.00	242,000	332,700	2,310	
9734	20	1	9	19	1	3	7.50	Dry	143.21	12.16	11.98	12.01	143.88	230,200	374,088	2,600	
9735	20*a*	1	6	15					142.81	12.10	12.00	12.00	144.00	254,000	318,500	2,212	
9736	20*b*	1	7	13					142.62	12.14	11.99	12.09	144.96	267,000	296,000	2,042	
9737	20*c*	1	6	29					142.71	12.13	12.00	12.00	144.00	279,000	287,800	1,999	

9738	23	1	7	21	1	3	8.03	Plastic..	144.07	12.12	12.05	11.99	144.48	202,200	348,000	2,409
9739	23*a*	1	6	10					138.55	12.18	12.01	12.00	144.12	162,000	249,300	1,730
9740	23*b*	1	7	9					142.78	12.22	12.03	12.02	144.60	267,000	297,600	2,058
9741	23*c*	1	6	26					144.33	12.10	11.99	12.09	144.96	251,000	292,500	2,018
9742	27	1	9	16	1	3	8.80	Excess..	142.07	12.26	12.04	12.01	144.60	260,200	346,500	2,396
9743	27*a*	1	6	11					142.15	12.18	12.03	12.05	144.96	191,000	290,100	2,001
9744	27*b*	1	7	0					141.89	12.15	12.01	12.06	144.84	255,000	292,000	2,016
9745	27*c*	1	7	8					141.42	12.20	11.98	12.08	144.72	234,000	291,400	2,013
9746	21	1	9	13	1	4	10.97	Dry.....	141.98	12.20	11.94	12.01	143.40	200,700	282,000	1,967
9747	21*a*	1	6	13					140.08	12.26	11.99	12.00	143.88	234,000	240,300	1,670
9748	21*b*	1	7	10					140.52	12.15	12.00	12.04	144.48	184,000	240,300	1,663
9749	21*c*	1	6	18					143.70	12.14	12.00	12.01	144.12	208,000	269,400	1,869
9750	24	1	9	18	1	4	10.90	Plastic..	141.23	12.12	12.03	12.00	144.36	230,900	299,800	2,077
9751	24*a*	1	6	9					138.77	12.16	12.01	11.98	143.88	214,000	252,000	1,751
9752	24*b*	1	7	1					140.88	12.15	11.98	12.05	144.36	207,000	260,400	1,804
9753	24*c*	1	6	26					142.03	12.21	12.05	11.99	144.48	219,000	242,900	1,681
9754	6	1	9	5	1	4	10.63	Excess..	141.12	12.17	11.98	12.01	143.88	230,200	345,600	2,402
9755	6*a*	1	6	16					140.55	12.06	12.02	11.98	144.00	163,000	286,400	1,989
9756	6*b*	1	7	18					140.35	12.27	12.01	12.01	144.24	241,000	265,500	1,841
9757	6*c*	1	6	29					144.66	12.09	12.00	12.00	144.00	262,000	330,700	2,296
9758	28	1	9	8	1	4	10.40	Excess..	141.05	12.15	12.00	12.10	145.20	203,200	280,400	1,931
9759	28*a*	1	6	15					138.35	12.11	12.03	11.96	143.88	199,000	253,700	1,763
9760	28*b*	1	6	30					141.81	12.22	12.00	12.07	144.84	254,000	279,500	1,930
9761	28*c*	1	6	21					141.59	12.12	12.01	12.01	144.24	221,000	253,600	1,758

CONCRETE CUBES MADE OF THOS. MILLEM & SONS' "WAYLAND" BRAND OF CEMENT.

Mortar, 33 per cent of broken stone.

9762	29	1	8	23	1	1	4.50	Dry.....	148.27	12.15	12.00	12.05	144.60	404,800	648,000	4,481
9763	29*a*	1	6	5					145.32	12.16	11.97	12.09	144.72	375,000	597,100	4,126
9764	29*b*	1	7	0					147.80	12.26	12.02	11.96	143.76	397,000	624,600	4,345
9765	29*c*	1	6	25					146.45	12.25	11.99	12.03	144.24	452,000	594,000	4,118
9766	34	1	8	30	1	1	6.50	Plastic	148.89	12.18	12.04	11.99	144.36	375,300	651,000	4,510
9767	34*a*	1	6	8					146.80	12.17	11.99	12.08	144.84	278,000	592,400	4,090
9768	34*b*	1	7	6					147.90	12.17	12.00	12.00	144.00	308,000	554,200	3,849
9769	34*c*	1	6	16					147.78	12.15	12.02	11.97	143.88	362,000	552,400	3,839
9770	39	1	8	29	1	1	5.23	Excess..	146.43	12.14	12.09	12.02	145.32	348,700	618,000	4,253
9771	39*a*	1	6	9					144.49	12.24	12.00	12.01	144.12	201,000	492,500	3,417
9772	39*b*	1	7	3					146.43	12.15	12.12	11.98	145.20	285,000	511,900	3,525
9773	39*c*	1	6	10					146.20	12.22	12.03	12.00	144.36	315,000	557,000	3,858
9774	30	1	8	25	1	2	6.62	Dry.....	146.06	12.16	12.06	12.00	144.72	318,384	487,400	3,368
9775	30*a*	1	6	5					143.22	12.18	12.00	11.99	143.88	276,000	402,200	2,795
9776	30*b*	1	7	9					144.58	12.19	11.98	12.01	143.88	225,000	376,400	2,616
9777	30*c*	1	6	21					144.25	12.24	12.03	12.02	144.60	306,000	401,100	2,774

CONCRETE CUBES MADE OF THOS. MILLEM & SONS' "WAYLAND" BRAND OF CEMENT—Continued.

Mortar, 33 per cent of broken stone.

No. of test.	Marks.	Age when tested.			Composition.			Consistency of mortar.	Weight per cubic foot.	Dimensions.			Sectional area.	First crack.	Ultimate strength.		Remarks.
					Cement.	Sand.	Broken stone.			Height.	Compressed surface.				Total.	Per square inch.	
		Yrs.	*Mos.*	*Days.*					*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. in.*	*Pounds.*	*Pounds.*	*Pounds.*	
9778	35	1	8	30	1	2	7.39	Plastic..	146.07	11.22	12.01	11.99	144.00	345,600	451,000	3,132	
9779	35*a*	1	6	2	......	......	......	....	142.42	12.25	12.01	12.04	144.60	268,000	371,300	2,568	
9780	35*b*	1	6	5	......	......	......	....	146.81	12.21	12.03	11.98	144.12	275,000	384,900	2,671	
9781	35*c*	1	6	21	......	......	......	....	144.96	12.19	11.96	12.06	144.24	228,000	394,600	2,736	
9782	40	1	8	27	1	2	6.23	Excess..	145.19	12.15	11.99	12.01	144.00	288,000	455,600	3,164	
9783	40*a*	1	6	4	......	......	......	....	142.87	12.21	11.98	12.01	143.88	272,000	381,100	2,640	
9784	40*b*	1	7	8	......	......	......	....	144.33	12.16	12.03	11.99	144.24	294,000	407,000	2,822	
9785	40*c*	1	6	13	......	......	......	....	143.64	12.27	12.00	11.99	143.88	277,000	395,800	2,751	
9786	31	1	9	1	1	3	9.38	Dry	140.20	12.21	12.05	12.00	144.60	231,300	306,000	2,116	
9787	31*a*	1	6	10	......	......	......	....	137.72	12.15	12.08	11.99	144.84	191,000	270,600	1,868	
9788	31*b*	1	7	6	......	......	......	....	141.11	12.14	12.00	12.02	144.24	297,000	327,500	2,271	
9789	31*c*	1	7	11	......	......	......	....	140.75	12.16	12.01	12.00	144.12	234,000	283,700	1,968	
9790	36	1	8	19	1	3	9.57	Plastic..	145.22	12.22	11.98	12.05	144.36	259,800	401,500	2,781	
9791	36*a*	1	6	1	......	......	......	....	142.22	12.13	12.01	12.01	144.24	229,000	314,300	2,179	
9792	36*b*	1	6	1	......	......	......	....	144.54	12.36	12.01	12.00	144.12	210,000	266,100	1,846	
9793	36*c*	1	6	3	......	......	......	....	144.44	12.10	12.01	12.04	144.60	217,000	292,600	2,023	
9794	41	1	8	26	1	3	9.37	Excess..	143.38	12.21	12.01	12.02	144.36	202,100	294,100	2,037	
9795	41*a*	1	6	1	......	......	......	....	137.86	12.16	12.05	12.04	145.08	145,000	207,400	1,429	
9796	41*b*	1	7	4	......	......	......	....	142.03	12.22	12.00	12.01	144.12	167,000	244,300	1,695	
9797	41*c*	1	7	3	......	......	......	....	139.58	12.19	12.03	12.01	144.48	201,000	249,800	1,729	
9798	32	1	9	4	1	4	12.86	Dry.....	140.54	12.15	12.01	12.05	144.72	202,600	271,000	1,873	
9799	32*a*	1	6	10	......	......	......	....	140.52	12.16	11.99	12.04	144.36	189,000	252,100	1,746	
9800	32*b*	1	6	6	......	......	......	....	145.35	12.27	12.01	12.00	144.12	194,000	251,100	1,742	
9801	32*c*	1	6	14	......	......	......	....	144.20	12.12	12.01	12.02	144.36	224,000	271,300	1,879	
9802	37	1	7	15	1	4	12.80	Plastic..	144.32	12.11	12.05	12.00	144.60	144,000	254,600	1,761	
9803	37*a*	1	6	6	......	......	......	....	130.28	12.18	11.98	12.01	143.88	142,000	213,000	1,480	
9804	37*b*	1	6	27	......	......	......	....	141.58	12.21	12.01	12.11	145.44	149,000	228,200	1,569	
9805	37*c*	1	6	20	......	......	......	....	139.45	12.17	12.05	12.02	144.84	176,000	220,600	1,592	

9806	42	1	9	9	1	4	12.71	Excess	142.82	12.27	12.03	12.07	145.20	174,200	278,300	1,917
9807	42*a*	1	5	30					140.60	12.21	12.00	12.10	145.20	204,000	260,800	1,796
9808	42*b*	1	7	4					140.18	12.19	12.02	12.01	144.36	191,000	224,200	1,553
9809	42*c*	1	6	12					141.61	12.15	11.98	12.03	144.12	223,800	259,800	1,803
9810	33	1	9	12	1	5	15.41	Dry	142.22	12.13	12.02	12.00	144.24	173,000	282,600	1,959
9811	33*a*	1	6	8					140.66	12.15	12.04	12.03	144.84	166,000	226,100	1,561
9812	33*b*	1	6	2					142.74	12.15	12.00	12.04	144.48	94,000	164,700	1,140
9813	33*c*	1	7	12					141.15	12.18	12.02	12.00	144.24	171,000	214,500	1,487
9814	38	1	7	23	1	5	15.00	Plastic	142.84	12.15	12.01	12.00	144.12	158,000	246,500	1,710
9815	38*a*	1	6	6					139.27	12.17	12.00	11.98	143.76	139,000	214,600	1,493
9816	38*b*	1	7	3					140.79	12.16	12.00	12.07	144.84	166,000	215,200	1,486
9817	38*c*	1	6	15					140.46	12.17	12.01	12.10	145.32	157,000	229,900	1,582
9818	43	1	8	24	1	5	15.20	Excess	141.15	12.16	12.06	12.00	144.72	144,700	212,700	1,470
9819	43*a*	1	7	11					138.94	12.31	12.03	12.01	144.48	132,000	227,100	1,572
9820	43*b*	1	7	4					140.24	12.26	12.01	12.05	144.72	161,000	195,500	1,351
9821	43*c*	1	6	18					139.03	12.17	12.02	11.98	144.00	116,000	197,500	1,371

Mortar, 40 per cent of broken stone.

9822	44	1	8	16	1	1	5.11	Dry	148.15	12.17	12.02	12.00	144.24	432,700	613,400	4,252
9823	44*a*	1	6	4					144.24	12.23	12.00	12.00	144.00	323,000	569,800	3,957
9824	44*b*	1	6	24					146.43	12.20	12.02	11.99	144.12	352,000	551,500	3,827
9825	44*c*	1	6	18					146.91	12.15	11.98	12.02	144.00	398,000	551,000	3,826
9826	49	1	9	3	1	1	4.12	Plastic	147.54	12.16	12.00	12.00	144.00	403,200	642,600	4,462
9827	49*a*	1	7	7					144.96	12.20	12.00	12.01	144.12	372,000	566,100	3,928
9828	49*b*	1	6	22					146.81	12.21	12.05	12.06	145.32	308,000	563,600	3,878
9829	49*c*	1	6	16					146.19	12.21	12.02	12.00	144.24	316,000	609,000	4,222
9830	54	1	8	21	1	1	4.37	Excess	146.82	12.26	11.99	12.01	144.00	316,800	486,600	3,379
9831	54*a*	1	7	6					141.44	12.26	12.00	12.02	144.24	332,000	453,200	3,142
9832	54*b*	1	6	20					145.81	12.13	11.99	12.06	144.60	302,000	437,500	3,026
9833	54*c*	1	6	14					144.55	12.11	11.99	12.02	144.12	321,000	500,800	3,475
9834	45	1	8	16	1	2	7 62	Dry	145.22	12.20	12.00	12.05	144.60	347,000	533,000	3,686
9835	45*a*	1	6	1					143.68	12.10	11.98	12.01	143.88	356,000	469,900	3,266
9836	45*b*	1	6	23					145.09	12.20	12.03	12.01	144.48	398,000	461,000	3,191
9837	45*c*	1	6	18					143.77	12.26	12.05	12.00	144.60	420,000	502,000	3,472
9838	50	1	8	20	1	2	6.43	Plastic	143.48	12.19	11.99	12.03	144.24	346,100	484,500	3,359
9839	50*a*	1	7	5					142.37	12.17	11.99	12.04	144.36	273,000	416,000	2,882
9840	50*b*	1	6	21					145.09	12.21	12.02	12.01	144.36	272,000	389,000	2,695
9841	50*c*	1	6	14					142.95	12.15	12.00	11.98	143.76	248,000	417,500	2,904
9842	55	1	8	27	1	2	6.43	Excess	145.36	12.28	12.00	12.00	144.00	255,000	482,600	3,351
9843	55*a*	1	7	3					141.71	12.27	12.00	12.05	144.60	340,000	431,900	2,987
9844	55*b*	1	6	27					144.98	12.22	12.05	12.02	144.84	306,000	446,800	3,085
9845	55*c*	1	6	12					146.44	12.16	12.09	12.02	145.32	268,000	472,100	3,249

CONCRETE CUBES MADE OF THOS. MILLEM & SONS' "WAYLAND" BRAND OF CEMENT—Continued.

Mortar, 40 per cent of broken stone.

No. of test.	Marks.	Age when tested.			Composition.			Consistency of mortar.	Weight per cubic foot.	Dimensions.			Sectional area.	First crack.	Ultimate strength.		Remarks.
					Cement.	Sand.	Broken stone.			Height.	Compressed surface.				Total.	Per square inch.	
		Yrs.	*Mos.*	*Days.*					*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. in.*	*Pounds.*	*Pounds.*	*Pounds.*	
9846	46	1	8	23	1	3	8.18	Dry	141.05	12.20	12.05	12.00	144.60	260,200	328,500	2,272	
9847	46*a*	1	6	4					140.66	12.16	12.01	12.05	144.72	208,000	293,000	2,025	
9848	40*b*	1	7	0					142.80	12.21	12.03	12.09	145.44	242,000	329.900	2,268	
9849	46*c*	1	6	9					143.73	12.18	11.96	12.07	144.36	247,000	310,400	2,150	
9850	51	1	8	17	1	3	8.29	Plastic	141.73	12.30	12.03	12.03	144.72	231,500	322,800	2,230	
9851	51*a*	1	7	3					139.15	12.21	12.10	12.02	145.44	220,000	292,400	2,010	
9852	51*b*	1	6	28					142.29	12.23	12.01	12.01	144.24	252,000	286,400	1,986	
9853	51*c*	1	6	11					140.94	12.22	12.03	12.01	144.48	218,000	272,100	1,883	
9854	56	1	7	18	1	3	8.34	Excess	142.92	12.27	12.01	12.00	144.12	170,000	315,200	2,187	
9855	56*a*	1	7	3					138.62	12.24	12.03	12.00	144.36	220,000	299,300	2,073	
9856	56*b*	1	6	26					142.75	12.18	12.03	12.00	144.36	212,000	272,000	1,884	
9857	56*c*	1	6	3					142.29	12.26	11.99	12.00	143.88	197,000	275,900	1,918	
9858	47	1	8	22	1	4	10.71	Dry	140.52	12.31	12.03	12.02	144.60	202,440	271,800	1,880	
9859	47*a*	1	6	2					138.20	12.18	12.00	12.02	144.24	158,000	233,100	1,616	
9860	47*b*	1	6	22					139.61	12.23	12.00	12.02	144.24	196,000	225,500	1,563	
9861	47*c*	1	6	10					141.65	12.14	12.03	12.07	145.20	161,000	236,100	1,626	
9862	52	1	8	22	1	4	10.97	Plastic	140.88	12.29	12.02	12.06	144.96	190,000	258,200	1,781	
9863	52*a*	1	7	4					140.29	12.20	11.99	12.02	144.12	197,000	269,200	1,868	
9864	52*b*	1	6	15					142.57	12.21	12.03	12.11	145.68	174,000	229,200	1,573	
9865	52*c*	1	7	0					142.76	12.23	11.95	12.05	144.00	194,000	256,200	1,779	
9866	57	1	8	24	1	4	10.97	Excess	142.18	12.22	12.06	12.02	144.96	202,900	271,000	1,869	
9867	57*a*	1	7	3					140.07	12.22	12.03	12.00	144.36	214,000	264,200	1,830	
9868	57*b*	1	5	27					144.24	12.25	11.99	12.00	144.00	144,000	197,600	1,372	
9869	57*c*	1	6	3					142.38	12.20	12.00	12.00	144.00	154,000	231,500	1,608	
9870	48	1	8	22	1	5	11.25	Dry	141.36	12.15	12.00	12.01	144.12	201,700	264,000	1,832	
9871	48*a*	1	6	2					137.68	12.05	11.99	12.01	144.00	146,000	214,000	1,486	
9872	48*b*	1	7	2					138.04	12.15	12.00	12.02	144.24	160,000	192,400	1,334	
9873	48*c*	1	6	17					141.61	12.18	11.98	12.00	143.76	198,000	228,000	1,586	

9874	53	1	9	5	1	5	12.50	Plastic..	139.60	12.20	12.04	12.03	144.84	115,800	236,200	1,631
9875	53*a*	1	7	7					137.40	12.24	12.02	12.01	144.36	143,500	208,000	1,441
9876	53*b*	1	6	9					140.35	12.19	12.02	12.02	144.48	151,000	196,000	1,357
9877	53*c*	1	6	10					138.66	12.22	12.01	12.10	145.32	168,000	208,100	1,432
9878	58	1	8	23	1	5	12.90	Excess..	141.76	12.20	12.02	11.99	144.12	169,000	245,700	1,705
9879	58*a*	1	7	2					138.27	12.23	12.05	12.02	144.84	157,000	215,200	1,506
9880	58*b*	1	5	23					141.91	12.23	11.99	12.02	144.12	118,000	145,300	1,008
9881	58*c*	1	7	2					139.47	12.17	12.07	12.02	145.08	156,000	200,400	1,381

CONCRETE CUBES MADE OF THE GLENS FALLS PORTLAND CEMENT COMPANY'S "IRONCLAD" BRAND OF CEMENT.

Mortar, 33 per cent of broken stone.

9882	59	1	8	28	1	2	8.04	Dry.....	145.60	12.26	12.03	12.01	144.48	375,600	474,300	3,283
9883	59*a*	1	7	2					142.11	12.16	12.02	11.98	144.00	308,000	379,700	2,637
9884	59*b*	1	6	27					143.19	12.30	12.09	12.01	145.20	314,000	368,500	2,238
9885	59*c*	1	6	6					143.97	12.19	11.99	12.01	144.00	305,000	381,800	2,651
9886	62	1	7	14	1	2	7.76	Plastic..	144.37	12.22	11.99	12.05	144.48	270,000	416,300	2,881
9887	62*a*	1	5	29					142.07	12.27	11.98	12.06	144.48	201,000	327,200	2,265
9888	62*b*	1	6	17					143.42	12.31	12.02	12.01	144.36	272,000	364,200	2,523
9889	62*c*	1	6	10					142.26	12.20	11.99	12.02	144.12	278,000	365,800	2,538
9890	65	1	9	1	1	2	7.25	Excess..	144.58	12.17	12.00	12.01	144.12	288,200	429,400	2,979
9891	65*a*	1	6	8					141.36	12.30	12.00	12.03	144.36	211,000	317,000	2,196
9892	65*b*	1	6	23					143.83	12.15	11.99	12.02	144.12	298,000	300,600	2,086
9893	65*c*	1	6	4					143.59	12.17	11.99	12.02	144.12	308,000	358,000	2,484
9894	60	1	8	23	1	3	9.78	Dry	143.31	12.28	12.03	12.08	145.32	202,000	270,800	1,863
9895	60*a*	1	7	2					137.90	12.13	12.03	12.13	145.92	83,000	196,700	1,348
9896	60*b*	1	5	25					148.03	12.25	12.04	12.04	144.48	146,000	181,500	1,256
9897	60*c*	1	6	8					141.87	12.32	12.01	12.06	144.84	153,000	222,400	1,535
9898	63	1	8	23	1	3	10.00	Plastic..	143.31	12.25	12.04	12.10	145.68	172,000	291,500	2,001
9899	63*a*	1	6	3					139.39	12.23	12.10	12.00	145.20	101,000	240,800	1,658
9900	63*b*	1	6	25					141.74	12.27	12.04	12.09	145.56	90,000	246,500	1,693
9901	63*c*	1	6	4					139.54	12.28	12.06	12.02	144.96	189,000	239,000	1,649
9902	66	1	7	14	1	3	10.23	Excess..	142.57	12.22	12.02	12.11	145.56	160,000	279,300	1,919
9903	66*a*	1	6	2					138.79	12.22	12.02	12.10	145.44	97,000	213,500	1,468
9904	66*b*	1	6	24					141.22	12.24	12.06	12.02	144.96	188,000	240,700	1,660
9905	66*c*	1	6	23					141.04	12.20	12.00	12.03	144.36	147,000	263,500	1,825
9906	61	1	8	23	1	4	12.85	Dry	142.33	12.22	12.07	12.08	145.80	145,800	232,200	1,593
9907	61*a*	1	6	4					141.18	12.21	12.01	12.04	144.60	76,000	216,300	1,496
9908	61*b*	1	5	22					143.51	12.23	12.02	12.02	144.48	79,000	174,900	1,210
9909	61*c*	1	5	24					139.98	12.25	12.03	12.00	144.36	142,000	194,400	1,347

CONCRETE CUBES MADE OF THE GLENS FALLS PORTLAND CEMENT COMPANY'S "IRONCLAD" BRAND OF CEMENT—Continued.

Mortar, 33 per cent of broken stone.

No. of test.	Marks.	Age when tested.			Composition.			Consistency of mortar.	Weight per cubic foot.	Dimensions.			Sectional area.	First crack.	Ultimate strength.		Remarks.
					Cement.	Sand.	Broken stone.			Height.	Compressed surface.				Total.	Per square inch.	
		Yrs.	*Mos.*	*Days.*					*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. in.*	*Pounds.*	*Pounds.*	*Pounds.*	
9910	64	1	8	24	1	4	12.85	Plastic..	141.53	12.19	12.05	11.99	144.48	216,700	261,300	1,809	
9911	64*a*	1	5	27					139.55	12.19	12.00	12.02	144.24	69,000	179,700	1,246	
9912	64*b*	1	6	23					139.52	12.17	12.02	11.98	144.00	137,000	188,600	1,310	
9913	64*c*	1	6	0					141.22	12.26	12.05	12.01	144.72	128,000	198,300	1,370	
9914	67	1	8	25	1	4	15.00	Excess..	144.89	12.30	12.05	12.05	145.20	172,000	267,300	1,841	
9915	67*a*	1	5	26					139.60	12.19	12.04	12.01	144.60	115,680	204,700	1,416	
9916	67*b*	1	6	21					141.60	12.22	12.08	12.07	145.80	157,000	228,200	1,565	
9917	67*c*	1	6	8					141.48	12.27	12.02	12.07	145.08	204,000	225,500	1,554	

Mortar, 40 per cent of broken stone.

No. of test.	Marks.	Yrs.	Mos.	Days.	Cement.	Sand.	Broken stone.	Consistency of mortar.	Weight per cubic foot.	Height.	Compressed surface.	Compressed surface.	Sectional area.	First crack.	Total.	Per square inch.	Remarks.
9918	68	1	9	......	1	2	6.25	Dry.....	145.09	12.19	12.04	12.01	144.60	433,800	578,400	4,000	
9919	68*a*	1	5	23					143.32	12.14	11.98	12.00	143.76	282,000	415,400	2,889	
9920	68*b*	1	6	22					143.75	12.18	12.06	12.01	144.84	295,000	432,500	2,986	
9921	68*c*	1	6	4					144.47	12.20	11.98	12.05	144.36	353,000	432,000	2,992	
9922	71	1	8	12	1	2	6.71	Plastic..	144.37	12.26	11.98	12.04	144.24	432,700	519,264	3,600	
9923	71*a*	1	6	0					142.18	12.27	12.04	11.97	144.12	311,000	376,000	2,609	
9924	71*b*	1	6	22					143.97	12.20	11.99	12.02	144.12	330,000	394,600	2,738	
9925	71*c*	1	5	28					143.73	12.20	11.99	12.00	143.88	297,000	435,800	3,029	
9926	74	1	8	14	1	2	6.51	Excess..	145.24	12.28	12.00	12.05	144.60	347,000	496,800	3,436	
9927	74*a*	1	5	20					142.41	12.22	12.00	12.04	144.48	122,000	344,700	2,386	
9928	74*b*	1	6	21					144.50	12.25	12.00	12.02	144.24	312,000	391,500	2,714	
9929	74*c*	1	6	5					144.80	12.14	12.00	11.96	143.52	330,000	420,000	2,926	
9930	69	1	8	17	1	3	8.32	Dry.....	141.31	12.23	12.00	12.02	144.24	259,600	313,000	2,170	
9931	69*a*	1	5	25					139.40	12.29	12.04	12.00	144.48	198,000	248,000	1,716	
9932	69*b*	1	6	14					142.80	12.25	12.05	12.03	144.96	216,000	267,100	1,845	
9933	69*c*	1	6	9					142.80	12.27	12.01	12.00	144.48	229,000	286,800	1,985	
9934	72	1	8	14	1	3	8.38	Plastic..	140.49	12.26	12.05	12.01	144.72	245,000	318,384	2,200	
9935	72*a*	1	5	23					138.91	12.21	12.06	12.06	145.44	92,000	235,500	1,619	
9936	72*b*	1	6	11					142.78	12.24	12.03	12.02	144.60	206,000	250,100	1,730	
9937	72*c*	1	6	0					142.16	12.16	12.06	12.04	145.20	182,000	262,500	1,808	

9938	75	1	8	21	1	3	8.50	Excess..	143.52	12.23	11.99	12.00	144.96	260,900	365,000	2,518
9939	75*a*	1	5	20	......	......	......	....	140.76	12.23	12.05	12.10	145.80	204,000	291,100	1,997
9940	75*b*	1	6	11	......	......	......	....	141.74	12.30	12.08	12.00	144.96	210,000	269,900	1,862
9941	75*c*	1	6	5	......	......	......	....	140.97	12.22	12.02	12.08	145.20	241,000	283,600	1,953
9942	70	1	8	18	1	4	10.46	Dry	142.58	12.26	12.07	12,10	146.05	203,000	297,000	2,034
9943	70*a*	1	6	1	......	......	......	....	138.00	12.28	12.10	12.03	145.56	181,000	228,900	1,572
9944	70*b*	1	6	12	......	......	......	....	140.96	12.20	12.00	12.12	145.44	112,000	202,000	1,389
9945	70*c*	1	6	7	......	......	......	....	141.03	12.17	12.03	12.01	144.48	163,000	233,600	1,617
9946	73	1	8	13	1	4	11.25	Plastic..	141.35	12.22	12.04	12.09	145.56	203,700	269,800	1,854
9947	73*a*	1	5	19	......	......	......	....	138.50	12.13	12.04	12.11	145.80	108,000	209,500	1,437
9948	73*b*	1	6	19	......	......	......	....	141.13	12.28	12.08	12.03	145.32	152,000	201,600	1,387
9949	73*c*	1	6	6	......	......	......	....	141.48	12.23	12.03	12.10	145.56	152,000	218,200	1,499
9950	76	1	8	8	1	4	11.25	Excess..	140.64	12.25	12.06	12.08	145.68	178,000	255,200	1,752
9951	76*a*	1	5	30	......	......	......	....	139.08	12.28	12.07	12.05	145.44	116,000	208,000	1,430
9952	76*b*	1	6	20	......	......	......	....	141.39	12.30	12.00	12.11	145.32	143,000	206,000	1,418
9953	76*c*	1	6	4	......	......	......	....	139.70	12.30	12.10	12.01	145.32	159,000	208,200	1,433

CONCRETE CUBES MADE OF THE EMPIRE PORTLAND CEMENT COMPANY'S CEMENT.

Mortar, 33 per cent of broken stone.

9954	77	1	8	14	1	2	7.50	Dry	144.64	12.26	12.05	12.07	145.44	436,300	610,500	4,198
9955	77*a*	1	5	26	......	......	......	....	142.64	12.12	12.11	12.01	145.44	398,000	474,800	3,265
9956	77*b*	1	6	6	......	......	......	....	143.37	12.17	12.05	12.02	144.84	308,000	407,100	2,811
9957	77*c*	1	6	18	......	......	......	....	139.72	12.22	12.03	12.03	144.72	316,000	403,000	2,785
9958	80	1	8	7	1	2	6.71	Plastic..	143.21	12.36	12.02	12.00	144.24	345,800	427,600	2,964
9959	80*a*	1	6	17	......	......	......	....	142.82	12.14	12.00	11.96	143.52	267,000	327,500	2,282
9960	80*b*	1	6	17	......	......	......	....	143.66	12.28	12.05	12.01	144.72	292,000	362,000	2,501
9961	80*c*	1	6	3	......	......	......	....	142.08	12.13	12.02	11.97	143.88	284,000	341,000	2,370
9962	83	1	8	5	1	2	7.50	Excess..	145.37	12.29	12.04	12.01	144.60	375,900	491,640	3,400
9963	83*a*	1	5	17	......	......	......	....	142.35	12.18	11.98	12.00	143.76	208,000	377,900	2,629
9964	83*b*	1	5	18	......	......	......	....	147.07	12.31	12.01	12.06	144.84	192,000	370,300	2,557
9965	83*c*	1	6	28	......	......	......	....	143.41	12.25	12.06	12.01	144.84	352,000	435,800	3,009
9966	78	1	8	21	1	3	9.78	Dry	142.21	12.27	12.03	12.06	145.08	319,100	399,600	2,754
9967	78*a*	1	5	25	......	......	......	....	139.23	12.22	12.00	12.04	144.48	208,000	253,500	1,755
9968	78*b*	1	6	10	......	......	......	....	139.28	12.25	12.07	12.02	145.08	200,000	207,200	1,428
9969	78*c*	1	6	0	......	......	......	....	141.13	12.28	12.03	12.08	145.32	249,000	295,200	2,031
9970	81	1	8	6	1	3	10.23	Plastic..	142.81	12.24	12.07	12.04	145.32	232,500	344,800	2,373
9971	81*a*	1	6	16	......	......	......	....	140.22	12.23	12.01	12.04	144.60	195,000	295,000	2,040
9972	81*b*	1	6	16	......	......	......	....	142.69	12.25	12.01	12.10	145.32	255,000	285,700	1,966
9973	81*c*	1	5	24	......	......	......	....	140.28	12.24	12.04	12.10	145.68	174,000	244,300	1,677

CONCRETE CUBES MADE OF THE EMPIRE PORTLAND CEMENT COMPANY'S CEMENT—Continued.

Mortar, 33 per cent of broken stone.

No. of test.	Marks.	Age when tested.			Composition.			Consistency of mortar.	Weight per cubic foot.	Dimensions.			Sectional area.	First crack.	Ultimate strength.		Remarks.
					Cement.	Sand.	Broken stone.			Height.	Compressed surface.				Total.	Per square inch.	
		Yrs.	*Mos.*	*Days.*					*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. in.*	*Pounds.*	*Pounds.*	*Pounds.*	
9974	84	1	8	10	1	3	10.23	Excess..	141.92	12.23	12.02	12.03	144.60	212,000	326,000	2,254	
9975	84*a*	1	6	14					139.75	12.25	12.03	12.02	144.60	224,000	254,500	1,760	
9976	84*b*	1	6	16					143.13	12.23	12.02	11.99	144.12	206,000	264,700	1,837	
9977	84*c*	1	5	26					142.04	12.19	12.07	12.01	144.96	197,000	252,600	1,742	
9978	79	1	8	19	1	4	12.85	Dry.....	140.37	12.26	12.04	12.03	144.84	202,700	285,500	1,971	
9979	79*a*	1	6	17					139.15	12.25	12.06	12.02	144.96	110,000	224,000	1,545	
9980	79*b*	1	6	9					140.12	12.23	12.05	12.05	145.20	186,000	225,800	1,555	
9981	79*c*	1	6	4					139.65	12.11	12.05	12.02	144.84	195,000	230,600	1,592	
9982	82	1	8	6	1	4	13.24	Plastic..	140.79	12.30	12.03	12.11	145.68	174,800	270,300	1,855	
9983	82*a*	1	6	18					139.56	12.25	12.11	12.04	145.80	107,000	218,400	1,498	
9984	82*b*	1	5	16					143.56	12.28	12.11	12.08	146.29	152,000	176,700	1,208	
9985	82*c*	1	5	23					141.59	12.19	12.12	•12.06	146.17	131,553	223,600	1,530	
9986	85	1	8	23	1	4	13.24	Excess..	142.18	12.21	12.08	12.03	145.32	174,300	252,800	1,740	
9987	85*a*	1	6	22					138.74	12.31	12.00	12.03	145.44	146,000	216,400	1,488	
9988	85*b*	1	5	15					143.30	12.25	12.02	12.08	145.20	104,000	173,600	1,196	
9989	85*c*	1	5	28					140.14	12.09	12.02	12.07	145.08	139,000	221,700	1,528	

Mortar, 40 per cent of broken stone.

No. of test.	Marks.	Yrs.	Mos.	Days.	Cement.	Sand.	Broken stone.	Consistency of mortar.	Weight per cubic foot.	Height.	Compressed surface.	Compressed surface.	Sectional area.	First crack.	Total.	Per square inch.	Remarks.
9990	86	1	8	16	1	2	6.33	Dry	144.34	12.19	12.02	11.99	144.12	461,100	588,500	4,083	
9991	86*a*	1	6	22					142.70	12.12	11.99	12.02	144.12	424,000	469,000	3,254	
9992	86*b*	1	5	12					146.20	12.24	12.00	12.05	144.60	341,000	418,500	2,894	
9993	86*c*	1	5	15					143.87	12.24	12.00	12.00	144.00	416,000	492,600	3,421	
9994	89	1	8	15	1	2	6.43	Plastic..	144.62	12.24	12.10	11.98	144.96	406,000	537,000	3,704	
9995	89*a*	1	5	14					142.94	12.30	12.03	12.01	144.48	220,000	418,000	2,893	
9996	89*b*	1	6	13					145.12	12.25	12.11	12.02	145.56	323,000	411,000	2,824	
9997	89*c*	1	5	21					143.42	12.28	12.04	12.00	144.48	304,000	431,000	2,983	
9998	92	1	8	16	1	2	6.43	Excess..	144.29	12.34	12.01	12.00	144.12	(*a*)	425,200	2,950	
9999	92*a*	1	6	23					141.76	12.36	12.04	12.00	144.48	318,000	373,500	2,585	
10000	92*b*	1	6	12					143.86	12.20	12.00	12.02	144.24	321,000	381,500	2,645	
10001	92*c*	1	5	30					145.07	12.15	12.03	12.00	144.36	285,000	395,000	2,736	

10002	87	1	8	17	1	3	8.03	Dry	141.21	12.21	12.07	12.04	145.32	377,800	419,500	2,887
10003	87*a*	1	5	14					139.77	12.17	11.99	12.01	144.00	260,000	301,400	2,093
10004	87*b*	1	6	5					140.85	12.25	12.09	11.99	144.96	306,000	312,500	2,156
10005	87*c*	1	5	30					141.22	12.25	12.05	12.02	144.84	320,000	343,000	2,368
10006	90	1	8	21	1	3	8.33	Plastic	141.24	12.30	12.02	12.02	144.48	228,000	372,500	2,578
10007	90*a*	1	5	12					140.58	12.22	12.03	12.02	144.60	202,000	282,800	1,956
10008	90*b*	1	6	13					141.03	12.21	12.01	11.99	144.00	262,000	280,400	1,947
10009	90*c*	1	5	24					141.37	12.16	12.02	12.00	144.24	271,000	289,800	2,009
10010	93	1	8	14	1	3	8.58	Excess	143.83	12.38	12.04	12.03	144.84	275,000	314,500	2,171
10011	93*a*	1	6	22					139.64	12.22	12.02	12.09	145.32	136,000	260,100	1,790
10012	93*b*	1	6	11					142.34	12.29	12.08	12.00	144.96	233,000	271,300	1,872
10013	93*c*	1	5	28					141.16	12.19	12.03	12.02	144.60	197,000	262,800	1,817
10014	88	1	8	14	1	4	10.71	Dry	139.57	12.17	12.01	12.05	144.72	285,000	800,100	2,074
10015	88*a*	1	5	14					138.65	12.21	12.09	12.01	145.20	209,000	231,000	1,591
10016	88*b*	1	6	14					140.44	12.15	12.07	12.04	145.32	210,000	255,600	1,759
10017	88*c*	1	5	24					140.10	12.21	12.03	12.08	145.32	234,000	261,400	1,799
10018	91	1	8	20	1	4	10.71	Plastic	141.08	12.25	12.02	12.02	144.48	202,200	288,960	2,000
10019	91*a*	1	6	22					139.28	12.22	12.08	12.04	145.44	178,000	241,300	1,659
10020	91*b*	1	6	12					140.58	12.21	12.01	12.07	144.96	176,000	216,100	1,491
10021	91*c*	1	6	12					140.84	12.22	12.06	12.03	145.08	223,000	254,600	1,755
10022	94	1	8	14	1	4	10.97	Excess	139.20	12.28	12.05	12.06	145.32	174,300	235,900	1,623
10023	94*a*	1	6	21					138.36	12.28	11.99	12.13	145.44	101,000	214,500	1,475
10024	94*b*	1	6	4					140.70	12.33	12.09	12.05	145.68	158,000	203,400	1,396
10025	94*c*	1	5	30					139.20	12.27	12.04	12.08	145.44	157,000	202,500	1,392

CONCRETE CUBES MADE OF THE SAND-SILICA CEMENT COMPANY'S "CHAMPION" BRAND OF CEMENT.

Mortar, 33 per cent of broken stone.

10026	95	1	8	9	1	1	5.00	Dry	143.43	12.28	12.09	12.01	145.20	348,400	456,000	3,140
10027	95*a*	1	6	13					140.27	12.26	12.00	12.10	145.20	265,000	356,700	2,457
10028	95*b*	1	6	3					142.91	12.30	11.97	11.99	143.52	295,000	343,100	2,391
10029	95*c*	1	5	29					143.59	12.16	12.00	12.02	144.24	301,000	382,000	2,648
10030	98	1	8	8	1	1	4.79	Plastic	148.22	12.35	12.09	12.02	145.32	348,700	413,600	2,846
10031	98*a*	1	6	20					139.81	12.32	12.02	12.04	144.72	274,000	365,300	2,524
10032	98*b*	1	6	11					143.24	12.18	11.99	12.04	144.36	235,000	352,000	2,438
10033	98*c*	1	5	27					143.50	12.22	11.99	12.02	144.12	306,000	369,500	2,564
10034	101	1	8	7	1	1	5.11	Excess	143.04	12.28	12.01	12.00	144.12	288,200	403,600	2,800
10035	101*a*	1	6	11					138.36	12.32	12.02	12.06	144.96	221,000	299,400	2,065
10036	101*b*	1	6	9					141.40	12.33	12.08	12.02	145.20	219,000	305,400	2,103
10037	101*c*	1	5	26					142.94	12.27	12.01	12.04	144.60	234,000	310,000	2,148

a Not observed.

CONCRETE CUBES MADE OF THE SAND-SILICA CEMENT COMPANY'S "CHAMPION" BRAND OF CEMENT—Continued.

Mortar, 33 per cent of broken stone.

No. of test.	Marks.	Age when tested.			Composition.			Consistency of mortar.	Weight per cubic foot.	Dimensions.			Sectional area.	First crack.	Ultimate strength.		Remarks.
					Cement.	Sand.	Broken stone.			Height.	Compressed surface.				Total.	Per square inch.	
		Yrs.	*Mos.*	*Days.*					*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. in.*	*Pounds.*	*Pounds.*	*Pounds.*	
10038	96	1	8	19	1	2	7.14	Dry.....	143.86	12.20	12.00	12.02	144.24	317,300	403,872	2,800	
10039	96*a*	1	6	12	......	......	....	....	140.56	12.22	12.01	12.00	144.12	254,000	302,000	2,095	
10040	96*b*	1	6	12	......	......	....	....	143.01	12.23	11.98	12.02	144.00	264,000	309,900	2,152	
10041	96*c*	1	5	18	......	......	....	....	143.39	12.22	12.00	12.04	144.48	278,000	304,800	2,110	
10042	99	1	8	13	1	2	7.25	Plastic..	143.29	12.27	11.98	12.08	144.72	289,400	351,500	2,420	
10043	99*a*	1	6	20	......	......	....	....	139.41	12.30	12.01	12.02	144.36	261,000	304,600	2,110	
10044	99*b*	1	6	11	......	......	....	....	142.92	12.26	12.04	12.00	144.48	221,000	285,000	1,973	
10045	99*c*	1	5	27	......	......	....	....	143.64	12.21	12.10	12.01	145.32	282,000	301,300	2,073	
10046	102	1	8	5	1	2	6.92	Excess..	141.17	12.23	11.99	12.02	144.12	201,700	309,900	2,150	
10047	102*a*	1	6	17	......	......	....	....	138.68	12.30	12.00	12.03	144.36	162,000	259,000	1,794	
10048	102*b*	1	6	9	......	......	....	....	141.54	12.22	12.00	12.01	144.12	166,000	251,300	1,744	
10049	102*c*	1	6	7	......	......	....	....	141.65	12.32	12.06	12.11	146.05	163,000	256,700	1,758	
10050	97	1	8	12	1	3	9.59	Dry.....	139.81	12.14	12.03	12.06	145.08	145,000	231,000	1,591	
10051	97*a*	1	6	21	......	......	....	....	137.36	12.21	12.00	12.02	144.24	152,000	201,100	1,394	
10052	97*b*	1	6	0	......	......	....	....	139.62	12.20	12.11	12.00	145.32	128,000	185,100	1,274	
10053	97*c*	1	5	22	......	......	....	....	138.71	12.17	12.06	12.01	144.84	136,000	195,000	1,346	
10054	100	1	8	8	1	3	9.78	Plastic..	140.91	12.30	12.00	12.11	145.32	170,000	228,300	1.571	
10055	100*a*	1	6	11	......	......	....	....	138.20	12.19	12.01	12.00	144.12	105,000	183.100	1,270	
10056	100*b*	1	6	0	......	......	....	....	140.33	12.39	12.03	12.02	144.60	118,000	187,800	1,299	
10057	100*c*	1	5	26	......	......	....	....	142.80	12.26	12.05	12.00	144.60	130,000	174,400	1,206	
10058	103	1	8	2	1	3	9	Excess..	139.15	12.22	12.02	12.09	145.32	87,100	192,400	1,324	
10059	103*a*	1	5	12	......	......	....	....	138.01	12.32	12.04	12.05	145.08	48,000	156,800	1,081	
10060	103*b*	1	6	7	......	......	....	....	139.56	12.28	12.04	12.08	145.44	103,000	160,700	1,105	
10061	103*c*	1	5	24	......	......	....	....	140.90	12.28	12.08	12.05	145.56	114,800	169,100	1,162	
Mortar, 40 per cent of broken stone.																	
10062	104	1	8	2	1	1	3.90	Dry.....	143.23	12.20	11.99	12.00	143.88	489,100	546,000	3,795	
10063	104*a*	1	5	12	......	......	....	....	140.56	12.22	12.01	12.00	144.12	310,000	398,000	2,762	
10064	104*b*	1	6	0	......	......	....	....	144.01	12.25	12.02	12.00	144.24	368,000	404,500	2,804	
10065	104*c*	1	5	25	......	......	....	....	144.59	12.21	12.02	11.97	143.88	428,000	451,500	3,138	

10066	107	1	6	26	1	1	4.16	Plastic.	142.28	12.17	12.08	12.02	145.20	360,000	476,000	3,278
10067	107*a*	1	5	17					140.10	12.25	12.00	12.04	144.48	276,000	343,600	2,378
10068	107*b*	1	5	4					144.26	12.26	12.05	12.00	144.60	268,000	303,800	2,101
10069	107*c*	1	5	14					144.60	12.20	12.04	12.00	144.48	318,000	383,600	2,655
10070	110	1	8	0	1	1	4.20	Excess..	142.36	12.15	12.02	11.99	144.12	259,400	385,500	2,675
10071	110*a*	1	5	7					140.67	12.21	12.01	12.00	144.12	204,000	309,200	2,145
10072	110*b*	1	5	8					144.97	12.22	12.02	11.99	144.12	198,000	272,500	1,891
10073	110*c*	1	5	19					140.69	12.17	12.08	12.01	145.08	199,000	300,400	2,071
10074	105	1	6	26	1	2	5.18	Dry.....	141.01	12.18	12.01	12.00	144.12	360,000	374,400	2,508
10075	105*a*	1	5	8					137.51	12.19	11.99	12.08	144.84	224,000	274,600	1,895
10076	105*b*	1	6	6					141.99	12.12	12.04	12.03	144.84	267,000	309,900	2,140
10077	105*c*	1	5	23					140.85	12.19	12.09	12.07	145.93	298,000	318,700	2,184
10078	108	1	8	1	1	2	6.08	Plastic..	141.04	12.21	12.02	12.00	144.24	317,300	346,176	2,400
10079	108*a*	1	5	13					139.08	12.13	11.96	12.00	143.40	201,000	258,000	1,799
10080	108*b*	1	5	5					144.38	12.25	12.04	12.01	144.60	185,000	243,100	1,681
10081	108*c*	1	6	16					140.82	12.23	12.02	12.00	144.24	297,000	327,000	2,267
10082	111	1	8	0	1	2	6.18	Excess..	141.91	12.15	12.09	12.02	145.32	261,500	310,000	2,133
10083	111*a*	1	6	15					139.64	12.22	12.06	12.05	145.32	120,800	244,600	1,683
10084	111*b*	1	5	2					144.98	12.19	12.03	12.05	144.96	153,000	204,900	1,413
10085	111*c*	1	5	5					144.48	12.10	12.00	12.03	144.36	152,000	233,200	1,615
10086	106	1	6	27	1	3	8.03	Dry.....	138.87	12.21	12.05	12.03	144.96	189,000	218,200	1,505
10087	106*a*	1	5	10					137.07	12.10	12.01	12.08	145.08	164,000	189,000	1,303
10088	106*b*	1	6	6					140.00	12.26	11.98	12.08	144.72	158,000	206,200	1,425
10089	106*c*	1	5	14					141.48	12.27	12.05	12.04	145.08	179,000	198,100	1,365
10090	109	1	7	30	1	3	8.18	Plastic..	139.01	12.24	12.15	12.10	147.01	132,300	210,400	1,431
10091	109*a*	1	5	6					137.83	12.06	12.01	12.01	144.24	76,000	164,900	1,143
10092	109*b*	1	6	5					137.98	12.15	12.03	12.03	144.72	96,000	148,200	1,024
10093	109*c*	1	5	17					138.22	12.17	12.05	12.02	144.84	84,000	169,800	1,172
10094	112	1	8	0	1	3	8.65	Excess..	139.65	12.14	12.05	11.99	144.48	115,500	179,600	1,213
10095	112*a*	1	6	15					137.81	12.23	12.05	12.04	145.08	81,000	165,900	1,143
10096	112*b*	1	5	27					138.96	12.26	12.12	12.03	145.80	98,000	157,200	1,078
10097	112*c*	1	5	22					139.69	12.15	12.07	12.02	145.08	90,000	151,600	1,045

CONCRETE CUBES MADE FROM BUFFALO "PORTLAND" CEMENT, SO CALLED, A SELECTED NATURAL CLINKER.

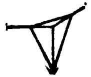
Mortar, 40 per cent of broken stone.

10098	113	1	7	24	1	2	6.43	Plastic..	141.07	12.21	12.02	12.06	144.96	275,400	303,800	2,096
10099	113*a*	1	5	6					141.19	12.22	12.06	12.00	144.72	190,000	237,900	1,644
10100	113*b*	1	5	16					140.93	12.21	12.02	12.03	144.60	187,000	204,000	1,411
10102	114*a*	1	5	5	1	3	8.18	Plastic..	137.69	12.20	12.04	12.09	145.56	76,000	149,900	1,030
10104	114*b*	1	5	12					142.26	12.16	12.03	12.02	144.60	71,000	128,100	886

MORTAR CUBES MADE OF BUFFALO "PORTLAND" CEMENT.

No. of test.	Marks.	Age when tested.			Composition.			Consistency of mortar.	Weight per cubic foot.	Dimensions.			Sectional area.	First crack.	Ultimate strength.		Remarks.
					Cement.	Sand.	Broken stone.			Height.	Compressed surface.				Total.	Per square inch.	
		Yrs.	*Mos.*	*Days.*					*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. in.*	*Pounds.*	*Pounds.*	*Pounds.*	
10105	115	1	7	26	1	2	None..	Dry	127.82	12.07	11.99	12.05	144.48	288,300	288,300	1,995	
10106	115*a*	1	6	14					126.40	12.05	11.99	11.97	143.52	280,400	280,400	1,954	
10107	115*b*	1	6	5					128.56	12.15	12.06	12.04	145.20	265,900	265,900	1,831	
10108	115*c*	1	5	16					129.20	12.22	12.02	12.02	144.48	265,600	265,600	1,838	

MORTAR CUBES MADE OF BUFFALO NATURAL CEMENT.

No. of test.	Marks.	Yrs.	Mos.	Days.	Cement.	Sand.	Broken stone.	Consistency of mortar.	Weight per cubic foot.	Height.	Compressed surface.	Compressed surface.	Sectional area.	First crack.	Total.	Per square inch.	Remarks.
10109	116	1	7	23	1	1	None..	Dry.....	130.07	12.23	12.05	12.08	145.56	506,400	506,400	3,479	
10110	116*a*	1	6	13					127.34	12.18	12.04	12.03	144.84	412,000	412,000	2,844	
10111	116*b*	1	6	3					131.14	12.20	12.06	12.09	145.80	477,000	477,000	3,272	
10112	116*c*	1	6	6					131.34	12.21	12.07	12.03	145.20	486,000	486,000	3,347	
10113	119	1	7	25	1	1	None..	Plastic..	127.75	12.05	12.01	12.01	144.24	403,100	403,100	2,795	
10114	119*a*	1	6	12					124.81	12.09	12.02	11.98	144.00	362,100	362,100	2,514	
10115	119*b*	1	6	3					129.26	12.05	12.11	12.07	146.17	389,900	389,900	2,667	
10116	119*c*	1	5	19					130.41	12.09	12.10	12.07	146.05	361,600	361,600	2,476	
10117	122	1	6	20	1	1	None.	Excess..	125.39	12.22	12.06	12.11	146.05	306,200	315,600	2,161	 Corner gone.
10118	122*a*	1	6	10					122.77	12.17	12.02	12.10	145.44	314,000	314,000	2,159	
10119	122*b*	1	5	22					124.90	12.26	12.07	12.08	145.80	291,000	291,000	1,996	
10120	122*c*	1	5	10					129.21	12.23	12.04	12.08	145.44	301,100	301,100	2,070	
10121	117	1	7	25	1	2	None .	Dry	129.39	12.15	12.04	12.12	145.92	321,024	321,024	2,200	
10122	.117*a*	1	6	12					125.35	12.19	12.09	12.02	145.32	298,000	298,000	2,051	
10123	117*b*	1	5	26					128.27	12.17	12.06	12.07	145.56	273,500	273,500	1,879	
10125	120	1	7	23	1	2	None .	Plastic..	123.46	12.21	12.04	12.02	144.72	258,000	258,000	1,783	
10126	120*a*	1	6	12					120.30	12.05	12.01	12.01	144.24	181,100	181,100	1,256	
10127	120*b*	1	5	24					123.54	12.15	12.04	12.00	144.48	195,100	195,100	1,350	
10128	120*c*	1	5	19					118.46	12.25	12.05	12.06	145.32	188,000	188,000	1,294	
10129	123	1	7	25	1	2	None .	Excess..	122.15	12.10	12.08	12.05	145.56	247,100	247,100	1,698	
10130	123*a*	1	6	10					118.51	12.06	12.01	12.03	144.48	200,200	200,200	1,386	
10131	123*b*	1	6	3					122.86	12 09	12.05	12.02	144.84	189,900	189,900	1,311	
10132	123*c*	1	5	16					125.23	12.15	12.03	12.06	145.08	197,000	197,000	1,358	

10133	118	1	7	25	1	3	None	Dry	122.14	12.32	12.11	12.09	146.41	169,000	169,000	1,154
10134	118*a*	1	6	8					119.59	12.18	12.06	12.05	145.32	141,200	143,500	987
10135	118*b*	1	6	4					123.19	12.19	12.07	12.18	147.01	155,000	155,000	1,054
10136	118*c*	1	5	25					122.30	12.20	12.07	12.09	145.03	140,300	140,300	961
10137	121	1	7	11	1	3	None	Plastic	119.55	12.05	12.07	12.00	144.84	144,840	144,840	1,000
10138	121*a*	1	6	11					116.52	12.18	12.04	12.06	145.20	128,200	128,200	883
10139	121*b*	1	6	4					118.41	12.13	12.08	12.12	146.41	120,400	120,400	822
10140	121*c*	1	5	7					120.01	12.20	12.05	12.12	146.05	101,000	101,000	692
10141	124	1	7	10	1	3	None	Excess	116.67	12.03	12.04	11.99	144.36	112,100	112,100	776
10142	124*a*	1	6	10					113.40	12.04	12.02	12.03	144.60	98,100	98,100	678
10143	124*b*	1	6	3					117.91	12.06	12.02	12.03	144.60	96,800	96,800	669
10144	124*c*	1	5	17					122.54	12.15	12.02	12.07	145.08	107,000	107,000	738

MORTAR CUBES MADE OF THE EMPIRE PORTLAND CEMENT COMPANY'S CEMENT.

10145	125	1	7	18	1	2	None	Dry	126.94	12.10	12.02	11.98	144.00	561,200	561,200	3,897
10146	125*a*	1	6	10					124.56	12.14	12.02	12.05	144.84	438,000	492,000	3,397
10147	125*b*	1	6	1					128.04	12.08	12.01	12.00	144.12	585,000	585,000	4,059
10148	125*c*	1	5	16					127.96	12.18	12.06	12.02	144.96	562,500	562,500	3,880
10149	128	1	7	22	1	2	None	Plastic	126.05	12.07	12.04	11.98	144.24	519,200	525,300	3,642
10150	128*a*	1	6	7					122.23	12.03	12.02	12.05	144.84	479,900	479,900	3,313
10151	128*b*	1	6	0					124.44	12.10	12.06	11.99	144.60	519,000	519,000	3,589
10152	128*c*	1	5	14					126.01	12.00	12.01	12.06	144.84	531,800	531,800	3,672
10153	126	1	7	18	1	3	None	Dry	122.07	12.08	12.02	12.04	144.72	361,000	361,000	2,494
10154	126*a*	1	6	9					118.76	12.16	12.06	11.98	144.48	308,000	308,000	2,132
10155	126*b*	1	6	1					121.37	12.15	12.03	12.03	144.72	354,600	354,600	2,450
10156	126*c*	1	5	15					121.30	12.10	11.99	11.99	143.64	358,000	358,000	2,492
10157	129	1	4	29	1	3	None	Plastic	122.37	12.17	11.99	12.00	143.88	312,000	312,000	2,168
10158	129*a*	1	6	8					118.52	12.16	12.02	12.02	144.48	312,700	312,700	2,164
10159	129*b*	1	5	21					120.89	12.03	12.01	12.07	144.96	329,000	329,000	2,270
10160	129*c*	1	5	15					122.17	12.09	12.04	12.00	144.48	313,200	313,200	2,168
10161	127	1	8	0	1	4	None	Dry	119.50	12.19	12.04	12.02	144.72	258,000	258,000	1,782
10162	127*a*	1	6	9					116.24	12.25	12.02	12.09	145.32	234,500	234,500	1,614
10163	127*b*	1	6	1					119.02	12.26	12.04	12.00	144.48	247,800	247,800	1,715
10164	127*c*	1	4	27					121.69	12.06	12.05	11.97	144.24	214,800	214,800	1.489
10165	130	1	7	22	1	4	None	Plastic	118.96	12.06	12.00	12.02	144.24	247,600	247,600	1,717
10166	130*a*	1	6	8					116.39	12.10	12.00	12.04	144.48	242,600	242,600	1,679
10167	130*b*	1	4	26					121.40	12.03	12.00	12.03	144.36	211,500	211,500	1,465
10168	130*c*	1	5	11					119.70	12.11	11.99	12.03	144.24	249,000	249,000	1,726

MORTAR CUBES MADE OF THE GLENS FALLS PORTLAND CEMENT COMPANY'S "IRONCLAD" BRAND OF CEMENT.

No. of test.	Marks.	Age when tested.			Composition.			Consistency of mortar.	Weight per cubic foot.	Dimensions.			Sectional area.	First crack.	Ultimate strength.		Remarks.
					Cement.	Sand.	Broken stone.			Height.	Compressed surface.				Total.	Per square inch.	
		Yrs.	*Mos.*	*Days.*					*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. in.*	*Pounds.*	*Pounds.*	*Pounds.*	
10169	134	1	7	21	1	2	None	Dry	129.67	12.15	12.01	12.10	145.32	581,280	581,280	4,000	
10170	134*a*	1	6	6					126.95	12.12	12.01	12.04	144.60	522,800	522,800	3,615	
10171	134*b*	1	5	27					129.03	12.22	22.06	11.97	144.36	563.000	563,000	3,900	
10172	134*c*	1	5	7					128.25	12.25	12.02	12.01	144.36	(*a*)	438,000	3,034	
10173	135	1	7	23	1	3	None	Dry	125.63	12.10	12.04	11.99	144.36	429,200	429,200	2,973	
10174	135*a*	1	6	7					122.43	12.11	12.00	11.97	143.64	369,400	369,400	2,572	
10175	135*b*	1	4	27					126.10	12.14	12.04	12.00	144.48	340,800	340,800	2,359	
10176	135*c*	1	5	10					125.62	12.08	11.99	11.99	143.76	392,600	392,600	2,731	
10177	136	1	7	23	1	4	None	Dry	121.87	12.11	12.00	12.05	144.60	260,280	260,280	1,800	
10178	136*a*	1	6	1					117.47	12.08	11.99	12.01	144.00	224,800	224,800	1,561	
10179	136*b*	1	4	28					121.18	12.10	12.07	12.01	144.96	206,000	206,000	1,421	
10180	136*c*	1	4	27					122.94	12.07	11.98	11.98	143.52	244,800	244,800	1,706	

MORTAR CUBES MADE OF THE SAND-SILICA CEMENT COMPANY'S "CHAMPION" BRAND OF CEMENT.

No. of test.	Marks.	Yrs.	Mos.	Days.	Cement.	Sand.	Broken stone.	Consistency of mortar.	Weight per cubic foot.	Height.	Compressed surface.	Compressed surface.	Sectional area.	First crack.	Total.	Per square inch.	Remarks.
10181	143	1	7	6	1	1	None	Dry	127.61	12.06	12.00	12.00	144.00	557,200	557,200	3,869	
10182	143*a*	1	6	6					125.06	12.06	12.00	12.03	144.36	472.000	472,000	3,270	
10183	143*b*	1	5	27					126.41	12.06	11.99	12.03	144.24	524,800	524,800	3,638	
10184	143*c*	1	5	14					125.66	12.21	12.07	11.99	144.72	495,800	495,800	3,426	
10185	144	1	7	6	1	2	None	Dry	124.81	12.07	12.00	12.02	144.24	388,000	388,000	2,690	
10186	144*a*	1	6	5					120.95	12.05	11.99	11.99	143.76	314,600	314,600	2,188	
10187	144*b*	1	5	26					123.88	12.01	12.04	12.01	144.60	320,600	320,600	2,217	
10188	144*c*	1	5	14					125.73	12.05	11.98	12.02	144.00	337.300	337,300	2,342	
10189	145	1	7	7	1	3	None	Dry	119.86	12.10	11.98	12.01	143.88	227,500	227,500	1,581	
10190	145*a*	1	6	6					116.99	12.00	11.96	11.99	143.40	188,500	188,500	1,314	
10191	145*b*	1	5	19					119.45	11.99	12.05	11.99	144.48	191,400	191,400	1.325	
10192	145*c*	1	5	14					120.40	12.06	12.02	11.98	144.00	204,000	204,000	1,417	

a Not observed.

TABLE No. 3.

The elastic properties of concrete.

Size of specimens, 12-inch cubes.
Age when tested, between 1 year 5 months and 1 year 10 months.
Gauged length, 5″.

Marks.	Brand of cement.	Mortar.			Consistency of mortar.	Modulus of elasticity between loads per square inch of—			Permanent sets after loads per square inch of—			Compressive strength per square inch.
		Composition.		Per cent of broken stone.		100 and 600.	100 and 1,000.	1,000 and 2,000.	600.	1,000.	2,000.	
		Cement.	Sand.									
						Pounds.	*Pounds.*	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Pounds.*
7	Genesee	1	1	33	Dry	3,571,000	2,812,000	1,667,000	.0002	.0005	.0020	4,059
7a	do	1	1	33	do	1,786,000	1,452,000		.0008	.0019	.0089	4,055
12	do	1	1	33	Plastic	2,273,000	2,143,000	1,429,000	.0001	.0006	.0033	3,800
16	do	1	1	33	Excess	2,083,000	2,045,000	1,163,000	.0003	.0011	.0055	3,797
1	do	1	2	33	Dry	3,571,000	4,091,000	2,500,000	.0001	.0004	.0014	3,680
17	do	1	2	33	Excess	1,667,000	1,406,000		.0073	.0118	.0270	2,902
8	do	1	3	33	Dry	3,125,000	2,647,000	1,190,000	.0001	.0005	.0031	3,289
2	do	1	3	33	Plastic	1,471,000	1,500,000		.0046	.0094	.0229	3,022
13	do	1	3	33	do	2,273,000	2,143,000		.0014	.0036	.0114	2,680
18	do	1	3	33	Excess	1,562,000	1,607,000		.0068	.0098	.0117	2,728
9	do	1	4	33	Dry	1,562,000	1,324,000		.0015	.0044	.0149	2,220
14	do	1	4	33	Plastic	1,087,000	1,154,000		.0137	.0191		2,120
3	do	1	4	33	Excess	1,562,000	1,667,000		.0009	.0028	.0109	2,564
10	do	1	5	33	Dry	1,389,000	1,216,000		.0043	.0108		1,760
10a	do	1	5	33	do	1,250,000	1,184,000		.0034	.0079		1,775
15	do	1	5	33	Plastic	1,471,000	1,500,000		.0042	.0078		1,991
11	do	1	6	33	Dry	1,087,000			.0081	.0204		1,365
25	do	1	1	40	Excess	1,786,000	1,800,000	1,163,000	.0001	.0008	.0060	3,684
25a	do	1	1	40	do	1,471,000	1,216,000		.0012	.0034	.0165	2,976
4	do	1	2	40	Dry	2,083,000	2,045,000	1,429,000	.0002	.0008	.0037	3,575
19	do	1	2	40	do	1,923,000	1,800,000	1,282,000	.0005	.0014	.0060	3,872
22	do	1	2	40	Plastic	3,125,000	2,812,000	1,667,000	.0001	.0006	.0030	3,400
26	do	1	2	40	Excess	1,923,000	1,667,000		0009	.0032	.0145	2,729

The elastic properties of concrete—Continued.

Marks.	Brand of cement.	Mortar.			Consistency of mortar.	Modulus of elasticity between loads per square inch of—			Permanent sets after loads per square inch of—			Compressive strength per square inch.
		Composition.		Per cent of broken stone.		100 and 600.	100 and 1,000.	1,000 and 2,000.	600.	1,000.	2,000.	
		Cement.	Sand.									
						Pounds.	*Pounds.*	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Pounds.*
5	Genesee	1	3	40	Dry	2,500,000	1,956,000		.0007	.0022	.0124	2,864
20	do	1	3	40	do	1,667,000	1,500,000		.0013	.0040	.0158	2,600
23	do	1	3	40	Plastic	1,250,000	1,500,000		.0016	.0041		2,409
27	do	1	3	40	Excess	1,562,000	1,364,000		.0017	.0046	.0175	2,396
21	do	1	4	40	Dry	1,786,000	1,552,000		.0025	.0071		1,967
24	do	1	4	40	Plastic	2,083,000	1,667,000		.0011	.0033	.0097	2,077
6	do	1	4	40	Excess	1,667,000	1,452,000		.0015	.0048	.0218	2,402
28	do	1	4	40	do	1,667,000	1,324,000		.0020	.0065		1,931
29	Wayland	1	1	33	Dry	2,273,000	2,143,000	1,136,000	.0002	.0006	.0030	4,481
34	do	1	1	33	Plastic	1,667,000	1,731,000	1,087,000	.0004	.0012	.0052	4,510
39	do	1	1	33	Excess	1,786,000	1,800,000	1,087,000	.0003	.0012	.0061	4,253
39*a*	do	1	1	33	do	1,562,000	1,324,000		.0011	.0028	.0109	3,417
30	do	1	2	33	Dry	2,083,000	1,956,000	1,136,000	.0004	.0012	.0079	3,368
35	do	1	2	33	Plastic	2,778,000	2,250,000	1,429,000	.0002	.0009	.0062	3,132
40	do	1	2	33	Excess	2,083,000	1,800,000		.0005	.0014	.0087	3,164
31	do	1	3	33	Dry	2,500,000	2,045,000		.0007	.0021	.0138	2,116
36	do	1	3	33	Plastic	2,083,000	1,667,000		.0008	.0026	.0110	2,781
41	do	1	3	33	Excess	1,471,000	1,452,000		.0022	.0065	.0153	2,037
32	do	1	4	33	Dry	1,667,000	1,364,000		.0024	.0080		1,873
37	do	1	4	33	Plastic	1,250,000			.0055	.0134		1,761
42	do	1	4	33	Excess	1,667,000	1,500,000		.0020	.0070		1,917
33	do	1	5	33	Dry	1,471,000	1,500,000		.0038	.0080		1,959
38	do	1	5	33	Plastic	1,562,000	1,046,000		.0065	.0157		1,710
43	do	1	5	33	Excess	1,250,000			.0058	.0136		1,470
44	do	1	1	40	Dry	2,778,000	2,250,000	1,087,000	.0001	.0004	.0042	4,252
49	do	1	1	40	Plastic	4,167,000	2,500,000	1,219,000	0.	.0002	.0024	4,462
54	do	1	1	40	Excess	2,273,000	2,045,000	1,111,000	.0004	.0009	.0052	3,379
45	do	1	2	40	Dry	2,083,000	1,875,000	1,111,000	.0005	.0012	.0066	3,686
50	do	1	2	40	Plastic	2,273,000	2,143,000	1,562,000	.0002	.0010	.0049	3,359
55	do	1	2	40	Excess	2,500,000	1,956,000		.0003	.0014		3,351

46	.....do	1	3	40	Dry.......	2,083,000	1,800,000	....	.0010	.0031	.0190	2,272
51	.....do	1	3	40	Plastic....	1,786,000	1,500,000	....	.0019	.0058	....	2,230
56	.....do	1	3	40	Excess....	1,667,000	1,364,000	....	.0015	.0054	.0214	2,187
47	.....do	1	4	40	Dry.......	1,316,000	1,184,000	....	.0026	.0057	....	1,880
52	.....do	1	4	40	Plastic....	1,471,000	1,184,000	....	.0047	.0106	....	1,781
57	.....do	1	4	40	Excess....	1,562,000	1,286,000	....	.0033	.0093	....	1,869
48	.....do	1	5	40	Dry.......	1,389,000	1,154,000	....	.0039	.0098	....	1,832
53	.....do	1	5	40	Plastic....	1,250,000	....	....	.0042	.0106	....	1,681
58	.....do	1	5	40	Excess...	1,316,000	1,046,000	....	.0063	.0148	....	1,705
59	Ironclad	1	2	33	Dry.......	2,500,000	2,368,000	1,282,000	.0003	.0010	.0066	3,283
62	.....do	1	2	33	Plastic....	2,778,000	2,500,000	....	.0003	.0010	.0095	2,881
62a	.....do	1	2	33	.....do	1,667,000	1,500,000	....	.0008	.0038	.0117	2,265
65	.....do	1	2	33	Excess....	3,125,000	2,812,000	....	.0001	.0007	.0089	2,979
60	.....do	1	3	33	Dry.......	1,667,000	1,250,000	....	.0021	.0099	....	1,863
63	.....do	1	3	33	Plastic....	1,923,000	1,216,000	....	.0009	.0069	....	2,001
66	.....do	1	3	33	Excess....	1,667,000	1,216,000	....	.0018	.0089	....	1,919
61	.....do	1	4	33	Dry.......	1,316,000	....	....	.0080	.0181	....	1,593
64	.....do	1	4	33	Plastic....	1,562,000	1,216,000	....	.0010	.0123	....	1,809
67	.....do	1	4	33	Excess....	1,667,000	....	....	.0035	.0110	....	1,841
67a	.....do	1	4	33	.....do	1,087,000	....	....	.0088	.0228	....	1,416
68	.....do	1	2	40	Dry	3,125,000	3,000,000	2,000,000	0.	.0002	.0017	4,000
71	.....do	1	2	40	Plastic....	3,571,000	3,000,000	2,000,000	.0001	.0003	.0018	3,600
74	.....do	1	2	40	Excess....	3,125,000	2,812,000	1,471,000	0.	.0004	.0032	3,436
69	.....do	1	3	40	Dry.......	2,083,000	1,667,000	....	.0010	.0033	.0278	2,170
72	.....do	1	3	40	Plastic ...	1,923,000	1,875,000	....	.0013	.0040	.0145	2,200
75	.....do	1	3	40	Excess....	2,500,000	1,731,000	....	.0009	.0035	.0160	2,518
70	.....do	1	4	40	Dry.......	1,923,000	1,667,000	....	.0017	.0053	....	2,034
73	.....do	1	4	40	Plastic ...	1,786,000	1,452,000	....	.0012	.0044	....	1,854
76	.....do	1	4	40	Excess....	1,667,000	1,286,000	....	.0033	.0100	....	1,752
77	Empire	1	2	33	Dry.......	2,778,000	2,500,000	1,721,000	.0004	.0008	.0025	4,198
80	.....do	1	2	33	Plastic....	2,273,000	2,368,000	1,351,000	.0001	.0012	.0078	2,964
83	.....do	1	2	33	Excess ...	3,571,000	2,647,000	1,250,000	.0001	.0004	.0058	3,400
78	.....do	1	3	33	Dry.......	3,125,000	2,812,000	1,282,000	.0001	.0009	.0074	2,754
81	.....do	1	3	33	Plastic ...	2,083,000	1,452,000	....	.0011	.0051	....	2,373
84	.....do	1	3	33	Excess ...	1,667,000	1,406,000	....	.0015	.0066	....	2,254
79	.....do	1	4	33	Dry.......	1,786,000	1,364,000	....	.0026	.0064	....	1,971
82	.....do	1	4	33	Plastic ...	1,389,000	1,184,000	....	.0041	.0108	....	1,855
82c	.....do	1	4	33	.....do	1,471,000	....	....	.0078	.0179	....	1,530
85	.....do	1	4	33	Excess ...	1,786,000	1,250,000	....	.0031	.0112	....	1,740

The elastic properties of concrete—Continued.

Marks.	Brand of cement.	Mortar.			Consistency of mortar.	Modulus of elasticity between loads per square inch of—			Permanent sets after loads per square inch of—			Compressive strength per square inch.
		Composition.		Per cent of broken stone.		100 and 600.	100 and 1,000.	1,000 and 2,000.	600.	1,000.	2,000.	
		Cement.	Sand.									
						Pounds.	*Pounds.*	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Pounds.*
86	Empire	1	2	40	Dry	2,778,000	2,647,000	2,273,000	.0003	.0007	.0026	4,083
89	do	1	2	40	Plastic	2,778,000	2,647,000	1,613,000	.0001	.0005	.0034	3,704
92	do	1	2	40	Excess	2,500,000	2,045,000	1,163,000	.0003	.0011	.0080	2,950
87	do	1	3	40	Dry	2,778,000	2,500,000	1,351,000	.0003	.0010	.0060	2,887
90	do	1	3	40	Plastic	2,273,000	2,143,000	...	.0009	.0027	.0138	2,578
93	do	1	3	40	Excess	2,778,000	1,875,000	...	.0006	.0030	...	2,171
88	do	1	4	40	Dry	2,500,000	2,045,000	...	.0005	.0014	...	2,074
91	do	1	4	40	Plastic	2,273,000	1,607,000	...	.0014	.0052	...	2,000
94	do	1	4	40	Excess	1,471,000	1,216,000	...	.0043	.0130	...	1,623
95	Champion	1	1	33	Dry	2,500,000	2,368,000	1,471,000	.0003	.0013	.0082	3,140
98	do	1	1	33	Plastic	2,273,000	2,250,000	1,282,000	.0002	.0015	.0094	2,846
101	do	1	1	33	Excess	3,571,000	2,143,000	...	0.	.0012	.0121	2,800
96	do	1	2	33	Dry	3,125,000	2,812,000	1,724,000	.0004	.0012	.0071	2,800
99	do	1	2	33	Plastic	2,778,000	2,143,000	...	.0004	.0019	.0167	2,429
102	do	1	2	33	Excess	1,923,000	1,667,000	...	.0019	.0069	.0324	2,150
97	do	1	3	33	Dry	1,667,000	...	...	.0035	.0113	...	1,591
100	do	1	3	33	Plastic	1,389,000	1,046,000	...	.0058	.0184	...	1,571
103	do	1	3	33	Excess	...	...	...	.0150	.0410	...	1,324
104	do	1	1	40	Dry	2,500,000	2,500,000	2,174,000	.0002	.0005	.0019	3,795
104*a*	do	1	1	40	do	2,778,000	2,368,000	1,351,000	.0005	.0010	.0054	2,762
107	do	1	1	40	Plastic	3,571,000	3,461,000	1,724,000	.0002	.0005	.0028	3,278
110	do	1	1	40	Excess	2,273,000	1,956,000	...	.0007	.0026	.0187	2,675
105	do	1	2	40	Dry	3,125,000	2,812,000	1,389,000	.0002	.0006	.0043	2,598
108	do	1	2	40	Plastic	2,500,000	2,143,000	1,163,000	.0006	.0016	.0103	2,400
111	do	1	2	40	Excess	1,923,000	1,731,000	...	.0016	.0044	.0161	2,138
106	do	1	3	40	Dry	1,923,000	1,364,000	...	.0012	.0061	...	1,505
109	do	1	3	40	Plastic	1,562,000	...	...	.0031	.0115	...	1,481
112	do	1	3	40	Excess	1,316,000	...	...	.0101	.0347	...	1,243
113	Buffalo natural	1	2	40	Plastic	2,083,000	1,956,000	...	.0003	.0015	...	2,096

TABLE NO. 4.

The elastic properties of mortar.

Size of specimens, 12-inch cubes.
Age when tested between 1 year 5 months and 1 year 10 months.
Gauged length, 5″.

Marks.	Brand of cement.	Composition of mortar.		Consistency of mortar.	Modulus of elasticity between loads per square inch of—			Permanent sets after loads per square inch of—			Compressive strength per square inch.
		Cement.	Sand.		100 and 600.	100 and 1,000.	1,000 and 2,000.	600.	1,000.	2,000.	
					Pounds.	*Pounds.*	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Pounds.*
115	Buffalo Portland	1	2	Dry	1,316,000	1,250,000	....	.0005	.0017	....	1,995
116	Buffalo natural	1	1	.....do	1,667,000	1,452,000	1,389,000	.0001	.0005	.0033	3,479
119	.....do	1	1	Plastic	2,500,000	1,875,000	1,190,000	0.	.0001	.0027	2,795
122	.....do	1	1	Excess	2,273,000	1,800,000	833,000	.0001	.0005	.0064	2,161
117	.....do	1	2	Dry	1,471,000	1,364,000	1,042,000	.0002	.0011	.0120	2,200
120	.....do	1	2	Plastic	1,250,000	1,250,000	....	.0002	.0017	....	1,783
123	.....do	1	2	Excess	1,250,000	1,184,000	....	.0005	.0020	....	1,698
118	.....do	1	3	Dry	1,042,000	....	....	.0038	.0109	....	1,154
121	.....do	1	3	Plastic	1,087,000	....	....	.0017	....	....	1,000
121c	.....do	1	3	.....do	785,000	....	....	.0076	....	....	692
124	.....do	1	3	Excess	735,000	....	....	.0062	....	....	776
125	Empire	1	2	Dry	3,571,000	2,500,000	1,923,000	0.	0.	.0006	3,897
128	.....do	1	2	Plastic	1,923,000	1,956,000	2,083,000	.0001	.0002	.0011	3,642
126	.....do	1	3	Dry	2,500,000	1,956,000	1,250,000	.0001	.0003	.0030	2,494
127	.....do	1	4	.....do	3,125,000	1,875,000	....	0.	.0006	....	1,782
130	.....do	1	4	Plastic	1,136,000	1,250,000	....	.0006	.0019	....	1,717
134	Ironclad	1	2	Dry	2,500,000	2,143,000	2,381,000	0.	0.	.0006	4,000
135	.....do	1	3	.....do	2,083,000	2,045,000	1,724,000	.0001	.0003	.0017	2,973
136	.....do	1	4	.....do	1,562,000	1,406,000	....	.0001	.0008	....	1,800
143	Champion	1	1	.....do	1,786,000	1,875,000	2,000,000	.0002	.0006	.0017	3,869
144	.....do	1	2	.....do	1,667,000	1,731,000	1,667,000	.0004	.0009	.0041	2,690
145	.....do	1	3	.....do	1,000,000	1,154,000	....	....	.0020	.0051	1,581

TABLE NO. 5.

Strength of concrete with reference to the composition and quantity of mortar.

Kind of cement.	Mortar.			Number of cubes tested.	Mean compressive strength per square inch.
	Composition.		Per cent of broken stone.		
	Cement.	Sand.			
					Pounds.
Genesee	1	1	33	12	3,752
	1	2	33	8	2,688
	1	3	33	16	2,562
	1	4	33	12	2,170
	1	5	33	8	1,732
	1	6	33	4	1,427
Genesee	1	1	40	4	3,191
	1	2	40	16	2,907
	1	3	40	16	2,199
	1	4	40	16	1,899
Wayland	1	1	33	12	4,034
	1	2	33	12	2,837
	1	3	33	12	1,995
	1	4	33	12	1,726
	1	5	33	12	1,515
Wayland	1	1	40	12	3,781
	1	2	40	12	3,177
	1	3	40	12	2,074
	1	4	40	12	1,697
	1	5	40	12	1,475
Ironclad	1	2	33	12	2,588
	1	3	33	12	1,656
	1	4	33	12	1,480
Ironclad	1	2	40	12	3,025
	1	3	40	12	1,950
	1	4	40	12	1,569
Empire	1	2	33	12	2,898
	1	3	33	12	1,968
	1	4	33	12	1,559
Empire	1	2	40	12	3,081
	1	3	40	12	2,137
	1	4	40	12	1,668
Champion	1	1	33	12	2,510
	1	2	33	12	2,099
	1	3	33	12	1,302
Champion	1	1	40	12	2,641
	1	2	40	12	1,984
	1	3	40	12	1,240
Buffalo Portland	1	2	40	3	1,717
	1	3	40	2	958

TABLE No. 6.

Condensed table showing the strength of concrete with reference to the quantity of mortar.

Kind of cement.	Mortar, per cent. of broken stone.	Number of cubes tested.	Mean compressive strength per square inch.
			Pounds.
Genesee	33	48	a 2,783
	40	52	2,401
Wayland	33	60	2,421
	40	60	2,441
Ironclad	33	36	1,908
	40	36	2,181
Empire	33	36	2,141
	40	36	2,295
Champion	33	36	1,970
	40	36	1,955
Buffalo Portland	40	5	1,413

a Does not include the 1:5 and 1:6 mixtures.

TABLE No. 7.

Strength of concrete with reference to the consistency of the mortar.

Kind of cement.	Consistency of mortar.	Number of cubes tested.	Mean compressive strength per square inch.
			Pounds.
Genesee	Dry	44	2,523
	Plastic	32	2,389
	Excess	36	2,515
Wayland	Dry	40	2,534
	Plastic	40	2,455
	Excess	40	2,305
Ironclad	Dry	24	2,081
	Plastic	24	2,019
	Excess	24	2,084
Empire	Dry	24	2,420
	Plastic	24	2,169
	Excess	24	2,066
Champion	Dry	24	2,180
	Plastic	24	1,985
	Excess	24	1,724
Buffalo Portland	Plastic	5	1,413

TABLE NO. 8.

Strength of concrete with reference to the treatment after setting.

Kind of cement.	Treatment.	Number of cubes tested.	Mean compressive strength per square inch.
			Pounds.
Genesee	Water and sand	28	2,785
	Cool cellar	28	2,377
	Weather only	28	2,336
	Wet burlap and weather	28	2,430
Wayland	Water and sand	30	2,680
	Cool cellar	30	2,360
	Weather only	30	2,284
	Wet burlap and weather	30	2,401
Ironclad	Water and sand	18	2,430
	Cool cellar	18	1,854
	Weather only	18	1,884
	Wet burlap and weather	18	2,011
Empire	Water and sand	18	2,643
	Cool cellar	18	2,087
	Weather only	18	2,002
	Wet burlap and weather	18	2,141
Champion	Water and sand	18	2,317
	Cool cellar	18	1,836
	Weather only	18	1,780
	Wet burlap and weather	18	1,918
Buffalo Portland	Water and sand	1	2,096
	Cool cellar	2	1,337
	Weather only	2	1,149

TABLE NO. 9.

Weight of concrete with reference to the composition and quantity of mortar.

Kind of cement.	Mortar.			Number of cubes weighed.	Mean weight per cubic foot.
	Composition.		Per cent of broken stone.		
	Cement.	Sand.			
					Pounds.
Geneseo	1	1	33	12	146.5
	1	2	33	8	141.8
	1	3	33	16	143.0
	1	4	33	12	142.3
	1	5	33	8	140.9
	1	6	33	4	139.5
Genesee	1	1	40	4	145.6
	1	2	40	16	143.6
	1	3	40	16	142.7
	1	4	40	16	141.2
Wayland	1	1	33	12	146.9
	1	2	33	12	144.5
	1	3	33	12	141.6
	1	4	33	12	141.7
	1	5	33	12	140.8
Wayland	1	1	40	12	145.8
	1	2	40	12	144.2
	1	3	40	12	141.6
	1	4	40	12	141.3
	1	5	40	12	139.7
Ironclad	1	2	33	12	143.4
	1	3	33	12	141.1
	1	4	33	12	141.4
Ironclad	1	2	40	12	144.0
	1	3	40	12	141.5
	1	4	40	12	140.5
Empire	1	2	33	12	143.4
	1	3	33	12	141.2
	1	4	33	12	140.8
Empire	1	2	40	12	144.0
	1	3	40	12	141.2
	1	4	40	12	139.8
Champion	1	1	33	12	142.1
	1	2	33	12	141.9
	1	3	33	12	139.6
Champion	1	1	40	12	142.7
	1	2	40	12	141.5
	1	3	40	12	138.9
Buffalo Portland	1	2	40	8	141.1
	1	3	40	2	140.0

TABLE NO. 10.

Condensed table showing the weight of concrete with reference to the quantity of mortar.

Kind of cement.	Mortar, per cent of broken stone.	Number of cubes tested.	Mean weight per cubic foot.
			Pounds.
Genosee	33	48	*a* 143.5
	40	52	142.7
Wayland	33	60	143.1
	40	60	142.5
Ironclad	33	36	142.0
	40	36	142.0
Empire	33	36	141.8
	40	36	141.7
Champion	33	36	141.2
	40	36	141.0
Buffalo Portland	40	5	140.6

a Does not include the 1:5 and 1:6 mixtures.

TABLE NO. 11.

Weight of concrete with reference to the consistency of the mortar.

Kind of cement.	Consistency of mortar.	Number of cubes weighed.	Mean weight per cubic foot.
			Pounds.
Genesee	Dry	44	142.2
	Plastic	32	142.9
	Excess	36	143.5
Wayland	Dry	40	142.8
	Plastic	40	143.1
	Excess	40	142.5
Ironclad	Dry	24	142.2
	Plastic	24	141.6
	Excess	24	142.1
Empire	Dry	24	141.3
	Plastic	24	141.9
	Excess	24	142.0
Champion	Dry	24	141.2
	Plastic	24	141.3
	Excess	24	140.9
Buffalo Portland	Plastic	5	140.6

TABLE NO. 12.

Weight of concrete with reference to the treatment after setting.

Kind of cement.	Treatment.	Number of cubes weighed.	Mean weight per cubic foot.
			Pounds.
Genesee	Water and sand	28	143.4
	Cool cellar	28	141.3
	Weather only	28	143.1
	Wet burlap and weather	28	143.4
Wayland	Water and sand	30	143.7
	Cool cellar	30	141.0
	Weather only	30	143.5
	Wet burlap and weather	30	142.9
Ironclad	Water and sand	18	143.2
	Cool cellar	18	140.8
	Weather only	18	142.5
	Wet burlap and weather	18	142.0
Empire	Water and sand	18	142.4
	Cool cellar	18	140.5
	Weather only	18	142.6
	Wet burlap and weather	18	141.5
Champion	Water and sand	18	141.5
	Cool cellar	18	138.9
	Weather only	18	142.0
	Wet burlap and weather	18	142.0
Buffalo Portland	Water and sand	1	141.1
	Cool cellar	2	139.4
	Weather only	2	141.6

TABLE NO. 13.

Strength of mortar with reference to the composition of the same.

Kind of cement.	Composition.		Number of cubes tested.	Mean compressive strength per square inch.
	Cement.	Sand.		
				Pounds.
Buffalo Portland	1	2	4	1,905
Buffalo natural	1	1	12	2,648
	1	2	11	1,597
	1	3	12	868
Empire	1	2	8	3,681
	1	3	8	2,292
	1	4	8	1,648
Ironclad	1	2	4	3,637
	1	3	4	2,659
	1	4	4	1,622
Champion	1	1	4	3,551
	1	2	4	2,359
	1	3	4	1,409

TABLE No. 14.

Strength of mortar, with reference to the consistency of the same.

Kind of cement.	Consistency of mortar.	Number of cubes tested.	Mean compressive strength, per square inch.
			Pounds.
Buffalo Portland	Dry	4	1,905
Buffalo natural	....do	11	2,112
	Plastic	12	1,628
	Excess	12	1,417
Empire	Dry	12	2,617
	Plastic	12	2,464
Ironclad	Dry	12	2,639
Champion	....do	12	2,440

TABLE No. 15.

Strength of mortar with reference to the treatment after setting.

Kind of cement.	Treatment.	Number of cubes tested.	Mean compressive strength per square inch.
			Pounds.
Buffalo Portland	Water and sand	1	1,995
	Cool cellar	1	1,954
	Weather only	1	1,831
	Wet burlap and weather	1	1,836
Buffalo natural	Water and sand	9	1,894
	Cool cellar	9	1,640
	Weather only	9	1,669
	Wet burlap and weather	8	1,617
Empire	Water and sand	6	2,616
	Cool cellar	6	2,383
	Weather only	6	2,591
	Wet burlap and weather	6	2,571
Ironclad	Water and sand	8	2,924
	Cool cellar	8	2,582
	Weather only	3	2,560
	Wet burlap and weather	8	2,490
Champion	Water and sand	8	2,713
	Cool cellar	3	2,257
	Weather only	8	2,393
	Wet burlap and weather	3	2,395

TABLE No. 16.

Weight of mortar, with reference to the composition of the same.

Kind of cement.	Composition.		Number of cubes weighed.	Mean weight per cubic foot.
	Cement.	Sand.		
				Pounds.
Buffalo Portland	1	2	4	128.0
Buffalo natural	1	1	12	127.9
	1	2	11	123.4
	1	3	12	119.3
Empire	1	2	8	125.8
	1	3	8	120.9
	1	4	8	119.1
Ironclad	1	2	4	128.5
	1	3	4	124.9
	1	4	4	120.9
Champion	1	1	4	126.2
	1	2	4	123.8
	1	3	4	119.2

TABLE No. 17.

Weight of mortar, with reference to the consistency of the same.

Kind of cement.	Consistency of mortar.	Number of cubes weighed.	Mean weight per cubic foot.
			Pounds.
Buffalo, Portland	Dry	4	128.0
Buffalo, natural	Dry	11	126.4
	Plastic	12	122.7
	Excess	12	121.8
Empire	Dry	12	122.3
	Plastic	12	121.6
Ironclad	Dry	12	124.8
Champion	Dry	12	123.1

TABLE No. 18.

Weight of mortar, with reference to the treatment after setting.

Kind of cement.	Treatment.	Number of cubes weighed.	Mean weight per cubic foot.
			Pounds.
Buffalo, Portland	Water and sand	1	127.8
	Cool cellar	1	126.4
	Weather only	1	128.6
	Wet burlap and weather	1	129.2
Buffalo, natural	Water and sand	9	124.1
	Cool cellar	9	120.9
	Weather only	9	124.4
	Wet burlap and weather	8	124.9
Empire	Water and sand	6	122.6
	Cool cellar	6	119.5
	Weather only	6	122.5
	Wet burlap and weather	6	123.1
Ironclad	Water and sand	3	125.7
	Cool cellar	3	122.3
	Weather only	3	125.4
	Wet burlap and weather	3	125.6
Champion	Water and sand	3	124.1
	Cool cellar	8	121.0
	Weather only	3	123.2
	Wet burlap and weather	8	123.9

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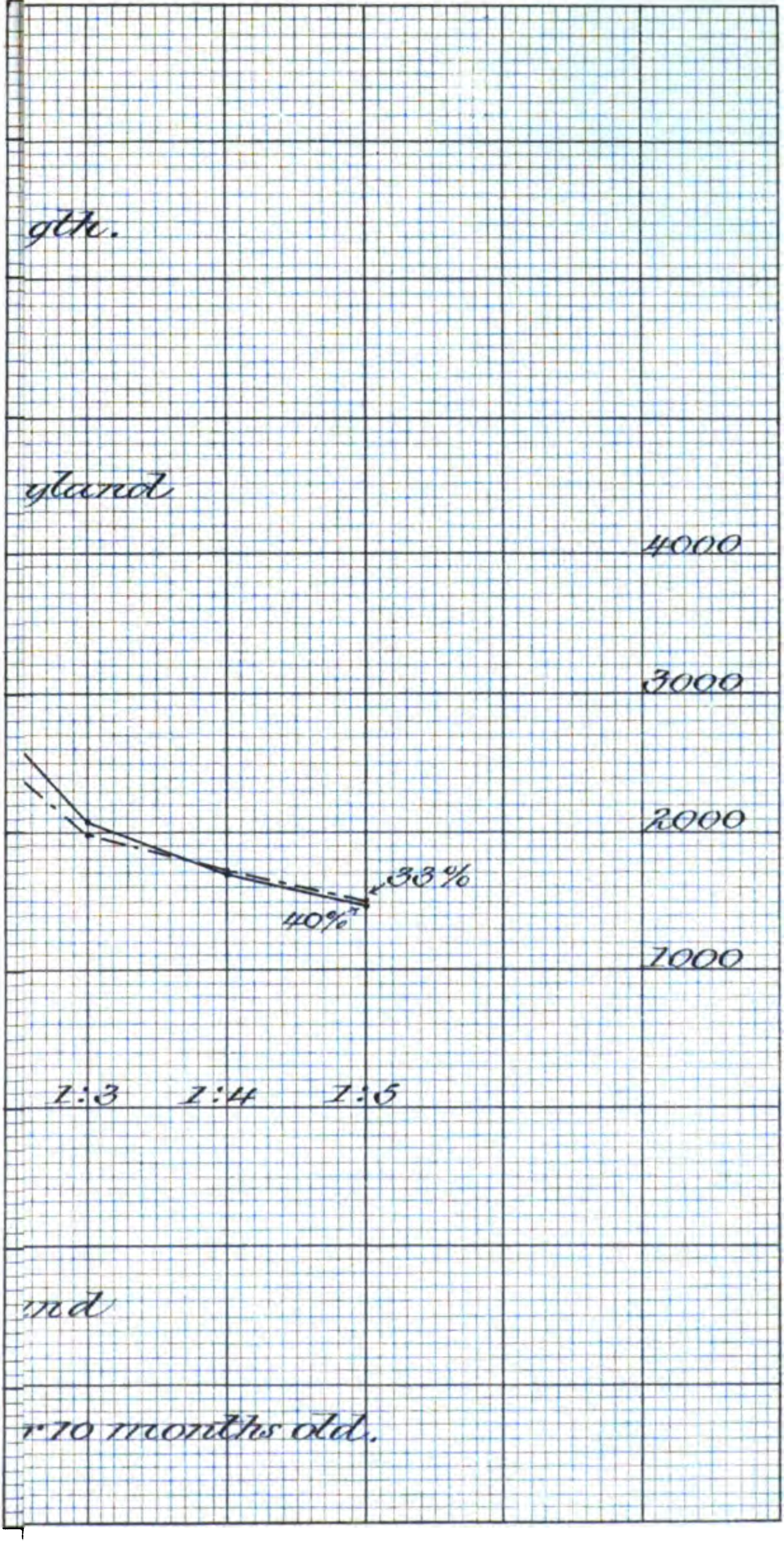

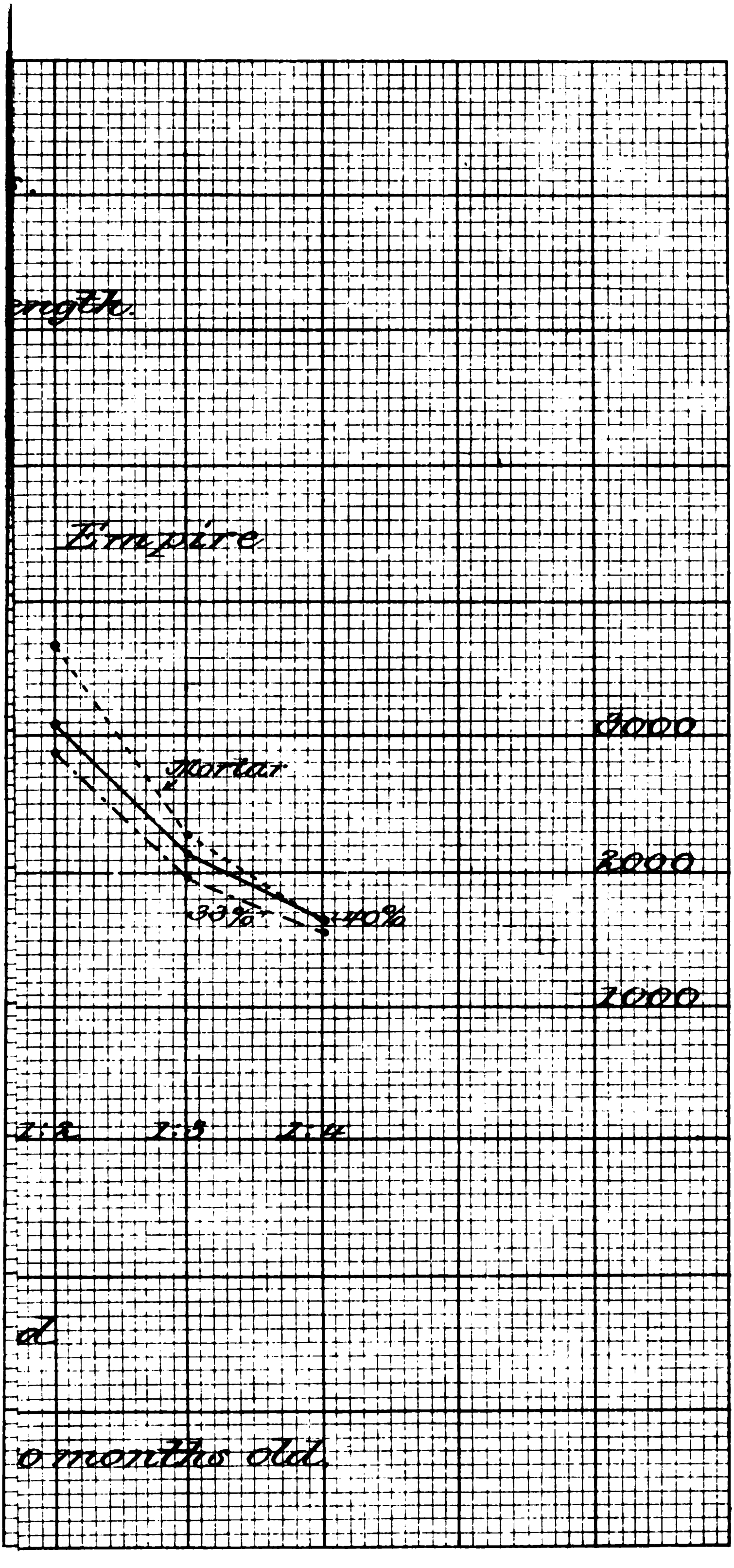
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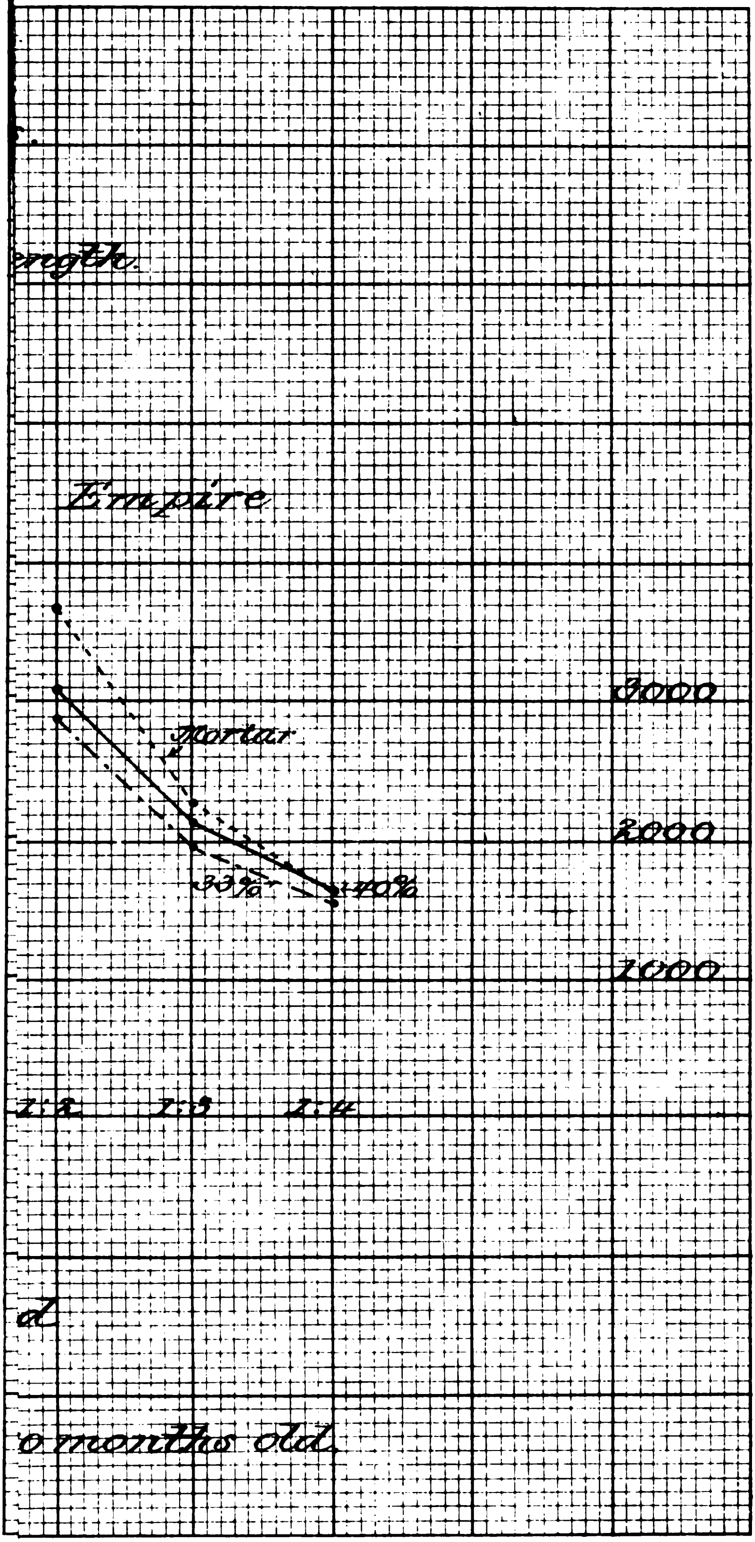
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CINDER CONCRETE.

12-INCH CUBES.

COMPRESSION TESTS AND MODULI OF ELASTICITY.

No. 10256.

Marks, 146.
Composition: Alpha cement, 1; sand, 1; cinder, 3.
Age, 90 days.
Weight per cubic foot, 113.66 pounds.
Sectional area, 143.16 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,316	100	0.	0.	Initial load.
28,632	200	.0001	0.	
42,948	300	.0002	0.	
57,264	400	.0004	0.	
85,896	600	.0010	0.	E = 2,500,000.
114,528	800	.0018	0.	
143,160	1,000	.0019	.0001	E = 2,500,000.
171,792	1,200	.0025	.0001	
200,424	1,400	.0032	.0002	E = 1,429,000.
229,056	1,600	.0039	.0003	
257,688	1,800	.0048	.0005	
286,320	2,000	.0059	.0006	
314,952	2,200	.0072	.0010	
343,584	2,400	.0088	.0013	
372,216	2,600	.0108	.0019	
398,000	2,780	....	....	Ultimate strength.

No. 10259.

Marks, 155.
Composition: Alpha cement, 1; sand, 2; cinder, 5.
Age, 90 days.
Weight per cubic foot, 108.45 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	.0004	.0002	
43,236	300	.0010	.0003	
57,648	400	.0016	.0004	
86,472	600	.0031	.0008	E = 1,087,000.
115,296	800	.0048	.0015	
144,120	1,000	.0075	.0028	E = 957,000.
172,944	1,200	.0112	.0049	
201,768	1,400	.0188	.0101	
202,000	1,402	....	....	Ultimate strength.

No. 10260.

Marks, 156.
Composition: Alpha cement, 1; sand, 2; cinder, 5.
Age, 90 days.
Weight per cubic foot, 110.69 pounds.
Sectional area, 144 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,400	100	0.	0.	Initial load.
28,800	200	.0002	0.	
43,200	300	.0005	0.	
57,600	400	.0009	0.	
86,400	600	.0019	.0002	E=1,471,000.
115,200	800	.0032	.0006	
144,000	1,000	.0045	.0010	E=1,286,000.
172,800	1,200	.0065	.0018	
201,600	1,400	.0094	.0031	
230,400	1,600	.0146	.0059	
247,000	1,715	....	....	Ultimate strength.

No. 10262.

Marks, 158.
Composition: Atlas cement, 1; sand, 1; cinder, 3.
Age, 90 days.
Weight per cubic foot, 116.26 pounds.
Sectional area, 142.92 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,292	100	0.	0.	Initial load.
28,584	200	.0001	0.	
42,876	300	.0001	0.	
57,168	400	.0003	0.	
85,752	600	.0006	0.	E = 4,167,000.
114,336	800	.0010	0.	
142,920	1,000	.0015	.0001	E = 3,214,000.
171,504	1,200	.0023	.0002	
200,088	1,400	.0031	.0003	E = 1,190,000.
228,672	1,600	.0041	.0005	
237,256	1,800	.0055	.0009	
285,840	2,000	.0070	.0014	
314,424	2,200	.0096	.0024	
338,500	2,368	.0180	....	Ultimate strength.

No. 10264.

Marks, 160.
Composition: Atlas cement, 1; sand, 1; cinder, 3.
Age, 90 days.
Weight per cubic foot, 116.32 pounds.
Sectional area, 142.56 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 356	100	0.	0.	Initial load.
28, 512	200	.0002	0.	
42, 768	300	.0004	0.	
57, 024	400	,0007	0.	
85, 536	600	.0013	.0001	E = 2,083,000.
114, 048	800	.0019	.0001	
142, 560	1, 000	.0026	.0002	E = 1,875,000.
171, 072	1, 200	.0034	.0005	
199, 584	1, 400	.0042	.0007	E = 1,351,000.
228, 096	1, 600	.0051	.0010	
256, 608	1, 800	.0063	.0012	
285, 120	2, 000	.0078	.0017	
313, 632	2, 200	.0098	.0025	
367, 800	2, 580	....	....	Ultimate strength.

No. 10265.

Marks, 167.
Composition: Atlas cement, 1; sand, 2; cinder, 5.
Age, 90 days.
Weight per cubic foot, 110.01 pounds.
Sectional area, 142.56 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 256	100	0.	0.	Initial load.
28, 512	200	.0002	0.	
42, 768	300	.0007	.0001	
57, 024	400	.0013	.0003	
85, 536	600	.0030	.0009	E = 1,190,000.
114, 048	800	.0060	.0024	
142, 560	1, 000	.0119	.0066	E = 849,000.
171, 072	1, 200	.0350	....	Ultimate strength.

No. 10267.

Marks, 169.
Composition: Atlas cement, 1; sand, 2; cinder, 5.
Age, 90 days.
Weight per cubic foot, 110.04 pounds.
Sectional area, 143.28 squares inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 328	100	0.	0.	Initial load.
28, 656	200	.0006	.0001	
42, 984	300	.0013	.0005	
57, 312	400	.0023	.0010	
85, 968	600	.0047	.0024	E=1,087,000.
114. 624	800	.0089	.0052	
143, 280	1, 000	.0141	.0089	E=865,000.
171, 936	1, 200	.0285	.0208	First crack.
181, 000	1, 263	....	....	Ultimate strength.

No. 10268.

Marks, 173.
Composition: Knickerbocker cement, 1; sand, 1; cinder, 3.
Age, 90 days.
Weight per cubic foot, 117.04 pounds.
Sectional area, 142.80 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 280	100	0.	0.	Initial load.
28, 560	200	.0002	0.	
42, 840	300	.0005	0.	
57, 120	400	.0008	0.	
85, 680	600	.0016	.0001	E=1,667,000.
114, 240	800	.0025	.0004	
142, 800	1, 000	.0037	.0008	E=1,552,000.
171, 360	1, 200	.0052	.0013	
199. 920	1, 400	.0073	.0023	
228. 480	1, 600	.0111	.0044	
257. 040	1, 800	.0183	.0098	
258, 000	....	....	....	First crack.
268, 000	1, 877	.0243	....	Ultimate strength.

No. 10271.

Marks, 179.
Composition: Kniekerbocker cement, 1; sand, 2; cinder, 5.
Age, 91 days.
Weight per cubic foot, 108.66 pounds.
Sectional area, 143.64 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,364	100	0.	0.	Initial load.
28,728	200	.0004	.0001	
43,092	300	.0013	.0006	
57,456	400	.0029	.0014	
71,820	500	.0055	.0083	
86,184	600	.0091	.0057	E = 735,000.
100,548	700	.0160	.0111	
114,912	800	.0256	.0193	
131,700	917	....	....	Ultimate strength.

No. 10272.

Marks, 180.
Composition: Knickerbocker cement, 1; sand, 2; cinder, 5.
Age, 91 days.
Weight per cubic foot, 108.48 pounds.
Sectional area, 144.96 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,496	100	0.	0.	Initial load.
28,992	200	.0015	.0009	
43,488	300	.0037	.0023	
57,984	400	.0067	.0046	
72,480	500	.0101	.0072	
86,976	600	.0151	.0113	E = 658,000.
101,472	700	.0225	.0174	
115,968	800	.0310	.0255	
126,200	871	....	....	Ultimate strength.

No. 10274.

Marks, 185.
Composition: Victor cement, 1; sand, 1; cinder, 3.
Age, 90 days.
Weight per cubic foot, 113.96 pounds.
Sectional area, 142.44 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 244	100	0.	0.	Initial load.
28, 488	200	.0001	0.	
42, 782	300	.0004	0.	
56, 976	400	.0006	0.	
85, 464	600	.0012	.0001	E=2,273,000.
113, 952	800	.0020	.0002	
142, 440	1, 000	.0029	.0005	E=1,875,000.
170, 928	1, 200	.0042	.0010	
199, 416	1, 400	.0058	.0016	
227, 904	1, 600	.0088	.0032	
256, 392	1, 800	.0130	.0055	
267, 700	1, 879	.0190	....	Ultimate strength.

TABLE No. 1.

CINDER CONCRETE.

TABULATION OF COMPRESSION TESTS.

No. of test.	Marks.	Brand of cement.	Composition.			Age when tested.	Weight per cubic foot.	Dimensions.			Sectional area.	First crack.	Ultimate strength.	
			Cement.	Sand.	Cinder.			Height.	Compressed surface.				Total.	Per square inch.
						Days.	*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds.*	*Pounds.*
10193	101	Germania	1	1	3	39	112.75	11.96	11.93	11.95	142.56	205,600	205,600	1,442
10194	102					39	111.34	12.02	11.92	11.97	142.68	209,100	209,100	1,465
10195	103					39	112.09	11.98	11.95	11.98	143.16	213,400	213,400	1,491
10196	107	Germania	1	2	3	39	114.81	11.83	12.05	12.01	144.72	163,600	163,600	1,130
10197	108					39	115.15	11.86	12.00	12.02	144.24	149,500	149,500	1,036
10198	109					39	115.63	11.95	11.88	12.00	142.56	160,800	160,800	1,128
10199	113	Germania	1	2	4	38	111.09	11.97	11.90	11.93	141.97	125,300	125,300	883
10200	114					38	110.96	11.88	11.93	11.95	142.56	130,300	130,300	914
10201	115					38	111.24	11.85	11.91	11.97	142.56	130,600	130,600	916
10202	119	Germania	1	2	5	38	108.84	11.90	11.99	11.99	143.76	120,800	120,800	840
10203	120					38	108.57	11.93	11.96	12.02	143.76	116,000	116,000	807
10204	121					38	109.12	11.86	11.98	11.87	142.20	92,800	93,700	659
10205	131	Germania	1	3	6	29	107.03	11.99	11.91	12.04	143.40	74,900	74,900	522
10206	132					29	108.13	11.96	11.99	11.98	143.64	76,400	76,400	532
10207	133					29	107.70	11.97	12.00	11.98	143.76	76,500	76,500	532
10208	137	Cathedral	1	1	3	29	110.91	11.98	11.90	11.94	142.09	147,800	147,800	1,040
10209	138					31	111.27	11.89	11.96	12.04	144.00	149,700	149,700	1,040
10210	139					29	109.99	11.88	12.07	11.97	144.48	146,800	146,800	1,016
10211	143	Cathedral	1	2	5	29	108.30	11.96	12.03	12.06	145.08	61,000	68,900	475
10212	144					29	109.80	12.00	11.98	11.96	143.28	67,600	69,300	484
10213	145					29	108.95	12.02	11.98	11.95	143.16	65,200	65,200	455
10214	149	Alpha	1	1	3	31	114.57	12.00	11.93	12.01	143.28	320,900	320,900	2,240
10215	150					31	116.91	12.00	11.96	12.05	144.12	362,800	362,800	2,517
10216	151					31	116.21	12.01	12.05	11.97	144.24	321,800	321,800	2,231

Tabulation of Compression Tests—Continued.

No. of test.	Marks.	Brand of cement	Composition.			Age when tested.	Weight per cubic foot.	Dimensions.			Sectional area.	First crack.	Ultimate strength.	
			Cement.	Sand.	Cinder.			Height.	Compressed surface.				Total.	Per square inch.
						Days.	*Pounds.*	*Inches.*	*Inches.*	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds.*	*Pounds.*
10217	152	Alpha	1	2	5	31	111.03	11.93	11.98	12.06	144.48	140,700	140,700	974
10218	153					31	110.75	11.98	12.04	11.98	144.24	131,800	181,800	914
10219	154					31	111.91	12.02	11.98	12.01	143.88	134,300	134,300	933
10220	161	Atlas	1	1	3	31	119.21	12.09	11.93	11.96	142.68	217,100	218,400	1,531
10221	162					31	118.62	11.98	11.89	11.94	141.96	231,400	231,400	1,630
10222	163					31	117.93	11.98	11.96	11.94	142.80	234,700	234,700	1,644
10223	164	Atlas	1	2	5	33	111.78	12.03	11.90	11.96	142.32	95,400	95,400	670
10224	165					33	110.17	11.99	12.01	11.90	142.92	91,000	91,000	637
10225	166					33	112.34	11.99	11.88	11.96	142.08	111,000	111,000	781
10226	170	Knickerbocker	1	1	3	33	118.24	11.98	11.99	11.98	143.64	203,400	203,400	1,416
10227	171					33	117.56	12.06	11.99	11.97	143.52	199,800	199,800	1,392
10228	172					33	118.94	12.01	11.92	11.95	142.44	214,700	214,700	1,507
10229	176	Knickerbocker	1	2	5	32	110.92	11.93	11.95	12.02	143.64	106,900	106,900	744
10230	177					32	110.24	11.94	12.04	11.96	144.00	104,300	104,300	742
10231	178					32	111.72	12.04	11.95	12.04	143.88	104,400	104,400	746
10232	182	Victor	1	1	3	32	115.82	12.00	11.92	11.89	141.73	194,400	194,400	1,372
10233	183					32	115.47	11.95	11.95	11.92	142.44	188,200	188,200	1,321
10234	184					32	116.98	12.03	11.95	11.92	142.44	205,600	205,600	1,443
10235	104	Germania	1	1	3	99	109.75	11.91	11.99	11.99	143.76	283,900	283,900	1,975
10236	105					102	110.19	11.95	11.98	11.94	143.04	286,200	287,000	2,006
10237	106					99	111.36	11.92	11.97	11.99	143.52	286,000	290,300	2,023
10238	110	Germania	1	2	3	102	112.74	11.92	11.88	11.96	142.08	229,000	229,000	1,612
10239	111					102	112.15	11.79	12.03	11.95	143.76	228,500	228,500	1,589
10240	112					102	113.89	11.80	12.06	11.94	144.00	244,900	244,900	1,701
10241	116	Germania	1	2	4	98	107.15	11.82	11.92	11.99	142.92	185,200	185,200	1,295
10242	117					98	108.41	11.85	11.89	12.02	142.92	190,800	190,800	1,335
10243	118					98	106.16	11.93	11.90	12.07	143.63	193,100	193,100	1,344

10244	122	Germania	1	2	5	101	105.93	11.91	11.88	11.99	142.44	149,900	149,900	1,052
10245	123					98	105.15	11.93	11.97	11.94	142.92	158,000	159,200	1,114
10246	124					98	104.75	11.91	11.88	11.98	142.32	154,500	154,500	1,086
10247	128	Germania	1	3	6	91	102.68	11.94	12.00	12.01	144.12	109,600	109,600	760
10248	129					91	103.01	11.99	12.02	11.96	143.76	107,700	107,700	749
10249	130					91	104.69	11.95	12.08	11.92	144.00	116,700	123,000	854
10250	134	Cathedral	1	1	3	91	108.04	11.96	11.93	11.91	142.09	207,700	207,700	1,462
10251	135					91	109.23	11.91	11.96	11.94	142.80	205,200	205,200	1,437
10252	136					91	106.15	11.95	11.90	12.02	143.04	179,900	183,100	1,280
10253	140	Cathedral	1	2	5	91	104.38	12.08	11.92	11.95	142.44	94,200	98,100	689
10254	141					91	103.79	11.99	11.92	11.97	142.68	86,400	94,100	660
10255	142					91	103.26	11.95	11.95	12.04	143.88	96,800	101,500	705
10256	146	Alpha	1	1	3	90	113.66	12.00	12.03	11.90	143.16	398,000	398,000	2,780
10257	147					90	113.63	11.98	11.92	12.06	143.76	393,100	393,100	2,734
10258	148					90	115.06	12.01	11.96	11.92	142.56	426,000	426,000	2,988
10259	155	Alpha	1	2	5	90	108.45	11.94	12.00	12.01	144.12	202,000	202.000	1,402
10260	156					90	110.69	11.98	12.01	11.99	144.00	247,000	247,000	1,715
10261	157					90	110.96	11.97	11.99	11.99	143.76	242,100	242,100	1,684
10262	158	Atlas	1	1	3	90	116.26	11.96	12.00	11.91	142.92	338,500	338,500	2,368
10263	159					90	116.38	11.98	11.93	12.00	143.16	328,600	328,600	2,295
10264	160					90	116.82	12.01	11.96	11.92	142.56	367,800	367,800	2,580
10265	167	Atlas	1	2	5	90	110.01	12.01	11.98	11.90	142.56	171,072	171,072	1,200
10266	168					90	109.59	11.96	11.92	12.00	143.04	170,800	172,400	1,205
10267	169					90	110.04	12.00	11.98	11.96	143.28	171,900	181,000	1,263
10268	173	Knickerbocker	1	1	3	90	117.04	12.02	12.00	11.90	142.80	258,000	268,000	1,877
10269	174					90	116.59	11.92	11.99	12.03	144.24	276,200	276,600	1,918
10270	175					90	115.85	11.98	12.00	12.01	144.12	269,200	270,400	1,876
10271	179	Knickerbocker	1	2	5	91	108.66	12.04	11.94	12.03	143.64	131,700	131,700	917
10272	180					91	108.48	11.95	12.01	12.07	144.96	126,200	126,200	871
10273	181					90	107.64	11.98	11.98	12.08	144.72	123,400	123,406	853
10274	185	Victor	1	1	3	90	113.96	12.03	11.91	11.96	142.44	267,700	267,700	1,879
10275	186					90	111.12	12.00	11.96	12.00	143.52	244,300	244,300	1,702
10276	187					90	110.99	11.99	11.97	11.96	143.16	255,400	255,400	1,784

TABLE NO. 2.

Mean strength of cinder concrete at different ages.

1:1:3 MIXTURE.

Brand of cement.	Mean compressive strength per square inch.		Mean compressive strength per square inch.		Gain.
	Age.	Strength.	Age.	Strength.	
	Days.	*Pounds.*	*Days.*	*Pounds.*	*Pounds.*
Germania	39	1,466	100	2,001	535
Cathedral	29	1,032	91	1,393	361
Alpha	31	2,329	90	2,834	505
Atlas	31	1,602	90	2,414	812
Knickerbocker	33	1,438	90	1,890	452
Victor	32	1,379	90	1,788	409

1:2:3 MIXTURE.

Germania	39	1,098	102	1,634	536

1:2:4 MIXTURE.

Germania	38	904	98	1,325	421

1:2:5 MIXTURE.

Germania	38	769	99	1,084	315
Cathedral	29	471	91	685	214
Alpha	31	940	90	1,600	660
Atlas	33	696	90	1,223	527
Knickerbocker	32	744	91	880	136

1:3:6 MIXTURE.

Germania	29	529	91	788	259

TABLE NO. 3.

Mean weight of cinder concrete at different ages.

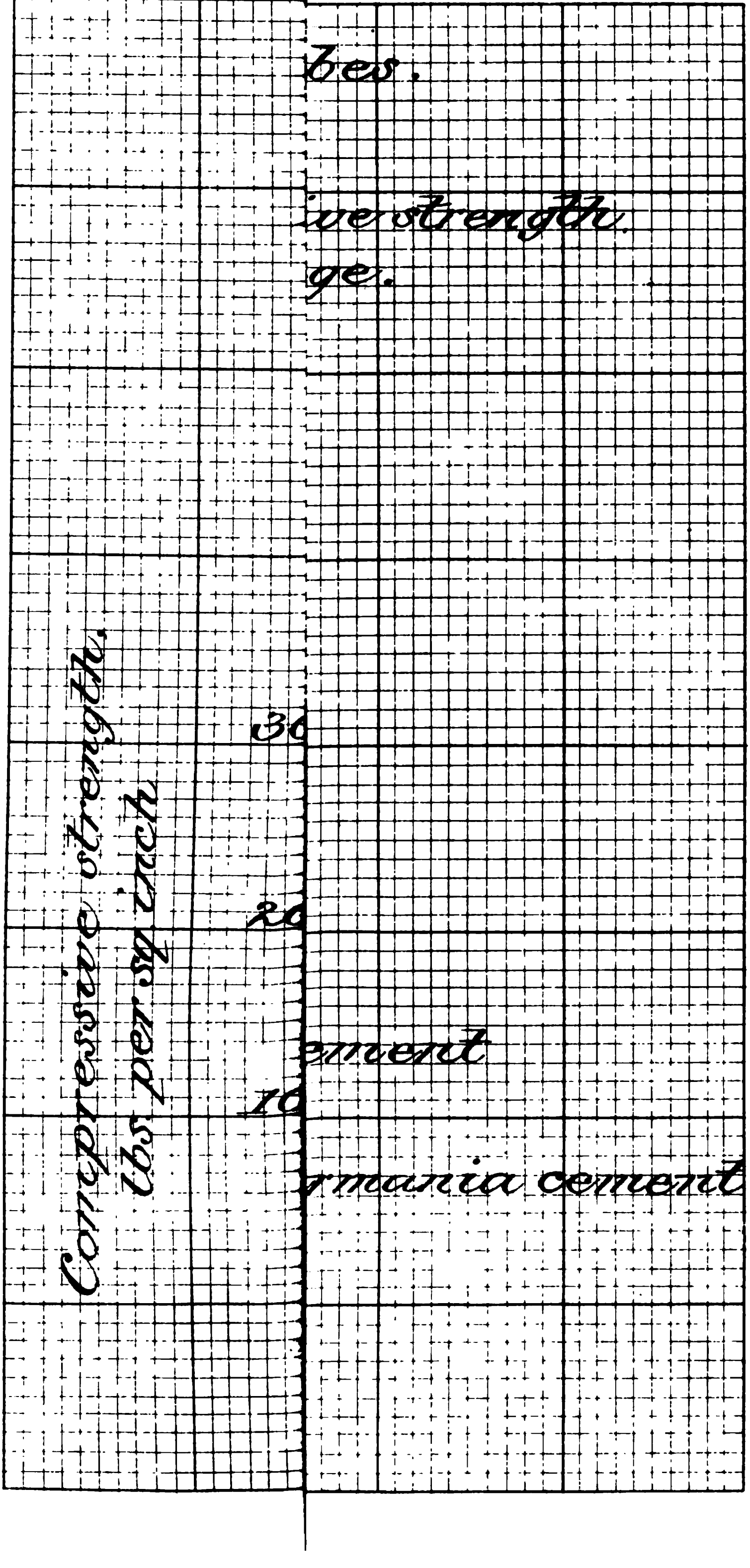
Brand of cement.	Composition.			Mean weight per cubic foot.		Mean weight per cubic foot.		Loss.
	Cement.	Sand.	Cinder.	Age.	Weight.	Age.	Weight.	
				Days.	*Pounds.*	*Days.*	*Pounds.*	*Pounds.*
Germania	1	1	3	39	112.1	100	110.4	1.7
	1	2	3	39	115.2	102	112.8	2.4
	1	2	4	38	111.2	98	107.9	3.3
	1	2	5	38	108.8	99	105.3	3.5
	1	3	6	29	107.6	91	103.5	4.1
Cathedral	1	1	3	29	110.7	91	107.8	2.9
	1	2	5	29	109	91	103.8	5.2
Alpha	1	1	3	31	115.9	90	114.1	1.8
	1	2	5	31	111.2	90	110	1.2
Atlas	1	1	3	31	118.6	90	116.3	2.3
	1	2	5	33	111.4	90	109.9	1.5
Knickerbocker	1	1	3	33	118.2	90	116.5	1.7
	1	2	5	32	111	91	108.3	2.7
Victor	1	1	3	32	116.1	90	112	4.1

TABLE No. 4.

Elastic properties of cinder concrete

Size of specimens, 12″ cubes.
Gauged length, 5″.

Marks.	Brand of cement.	Composition.			Age when tested.	Modulus of elasticity between loads per square inch of—			Permanent sets after loads per square inch of—			Compressive strength per square inch.
		Cement.	Sand.	Cinder.		100 and 600.	100 and 1,000.	1,000 and 2,000.	600.	1,000.	2,000.	
					Days.	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Pounds.*
146	Alpha	1	1	3	90	2,500,000	2,500,000	1,429,000	0.	.0001	.0006	2,780
155	.....do	1	2	5	90	1,087,000	957,000	....	.0008	.0028	....	1,402
156	.....do	1	2	5	90	1,471,000	1,286,000	....	.0002	.0010	....	1,715
158	Atlas	1	1	3	90	4,167,000	3,214,000	1,190,000	0.	.0001	.0014	2,368
160	.....do	1	1	3	90	2,083,000	1,875,000	1,351,000	.0001	.0002	.0017	2,580
167	.....do	1	2	5	90	1,190,000	849,000	....	.0009	.0066	....	1,200
169	.....do	1	2	5	90	1,087,000	865,000	....	.0024	.0089	....	1,263
178	Knickerbocker	1	1	3	90	1,667,000	1,552,000	....	.0001	.0008	....	1,877
179	.....do	1	2	5	91	735,000	....	....	.0057	....	....	917
180	.....do	1	2	5	91	658,000	....	....	.0113	....	....	871
185	Victor	1	1	3	90	2,273,000	1,875,000	....	.0001	.0005	....	1,879



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CONCRETE CUBES

MADE AT

WATERTOWN ARSENAL, MASSACHUSETTS.

COMPRESSION TESTS OF TRAP ROCK.

Representing material used in the manufacture of concrete.
Samples sawed out of larger blocks and rubbed to surface.
Compressed surfaces faced with plaster of paris.

No. of test.	Dimensions.			Sectional area.	First crack.	Ultimate strength.	
	Height.	Compressed surface.				Total.	Per square inch.
	Inches.	*Inches.*	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds.*	*Pounds.*
9523	4.02	3.98	4.00	15.92	530,200	530,200	33,304
9524	4.02	3.98	3.98	15.84	308,000	308,000	19,444

No. of test.	Manner of failure.
9623	Burst into small angular fragments.
9524	Burst into larger angular fragments. Stone was seamy.

CONCRETE—12-INCH CUBES.

Marks, 5.
Composition: Alpha cement, 1; sand, 1; broken stone, 3 (½″ ring stone).
Water used in mortar, 30.10 per cent of cement.
Age, 7 days.
Set in mold 1 day, in water 6 days.
Weight per cubic foot, 145.56 pounds.
Sectional area, 145.32 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,532	100	0.	0.	Initial load.
29,064	200	.0002	0.	
43,596	300	.0003	0.	
58,128	400	.0005	0.	
72,660	500	.0008	0.	
87,192	600	.0010	0.	E = 2,500,000 pounds per square inch.
101,724	700	.0013	0.	
116,256	800	.0016	0.	
130,788	900	.0022	.0001	
145,320	1,000	.0027	.0003	E = 1,875,000 pounds per square inch.
159,852	1,100	.0037	.0009	
174,384	1,200	.0051	.0016	
188,916	1,300	.0078	.0033	
202,100	1,391	.0139	....	Ultimate strength.

Marks, 6.
Composition: Alpha cement, 1; sand, 1; broken stone, 3 (½″ ring stone).
Water used in mortar, 30.10 per cent of cement.
Age, 19 days.
Set in mold 1 day, in water 18 days.
Weight per cubic foot, 149 pounds.
Sectional area, 144.48 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,448	100	0.	0.	Initial load.
28.896	200	.0002	0.	
43,344	300	.0003	.0001	
57.792	400	.0006	.0001	
72.240	500	.0008	.0001	
86,688	600	.0011	.0001	E = 2,500,000 pounds per square inch.
101,136	700	.0014	.0002	
115,584	800	.0016	.0003	
130,032	900	.0019	.0004	
144,480	1,000	.0024	.0006	E = 2,500,000 pounds per square inch.
173,376	1,200	.0034	.0009	
202.272	1,400	.0048	.0015	E = 962,000 pounds per square inch.
231,168	1,600	.0063	.0022	
260,564	1,800	.0091	.0039	
288,960	2,000	.0128	.0058	
317,856	2,200	.0206	.0113	
320.800	2,220	....	....	Ultimate strength.

Marks, 7.
Composition: Alpha cement, 1; sand, 1; broken stone, 3 (½″ ring stone).
Water used in mortar, 30.10 per cent of cement.
Age, 32 days.
Set in mold 1 day, in water 31 days.
Weight per cubic foot, 146.44 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	.0001	0.	
43,236	300	.0003	.0001	
57,648	400	.0005	.0001	
72.060	500	.0007	.0002	
86.472	600	.0009	.0002	E = 3,571,000 pounds per square inch.
100,884	700	.0011	.0003	
115,296	800	.0013	.0004	
129,708	900	.0016	.0005	
144,120	1,000	.0018	.0006	E = 3,750,000 pounds per square inch.
172,944	1,200	.0023	.0007	
201,768	1,400	.0029	.0007	E = 2,174,000 pounds per square inch.
230,592	1,600	.0035	.0010	
259,416	1,800	.0040	.0010	
288,240	2,000	.0045	.0010	
317,064	2,200	.0053	.0012	
345,888	2,400	.0065	.0016	
374,712	2,600	.0090	.0029	
403,536	2,800	.0150	....	Ultimate strength.

Marks, 8.
Composition: Alpha cement, 1; sand, 1; broken stone, 3 ($\frac{1}{2}''$ ring stone).
Water used in mortar, 30.10 per cent of cement.
Age, 76 days.
Set in mold 1 day, in water 75 days.
Weight per cubic foot, 153.34 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	0.	0.	
43,380	300	.0002	0.	
57,840	400	.0004	0.	
72,300	500	.0005	0.	
86,760	600	.0006	0.	E=4,167,000 pounds per square inch.
101,220	700	.0008	0.	
115,680	800	.0010	0.	
130,140	900	.0011	0.	
144,600	1,000	.0012	0.	E=3,750,000 pounds per square inch.
173,520	1,200	.0015	0.	
202,440	1,400	.0018	0.	E=3,571,000 pounds per square inch.
231,360	1,600	.0021	.0001	
260,280	1,800	.0024	.0001	
289,200	2,000	.0028	.0002	
318,120	2,200	.0031	.0003	
347,040	2,400	.0035	.0004	
375,960	2,600	.0039	.0004	
404,880	2,800	.0043	.0005	
433,800	3,000	.0046	.0005	
462,720	3,200	.0052	.0006	
491,640	3,400	.0056	.0009	
520,560	3,600	.0061	.0011	
549,480	3,800	.0067	.0012	
578,400	4,000	.0074	.0013	
607,320	4,200	.0083	.0016	
636,240	4,400	.0092	.0019	
665,160	4,600	.0103	.0023	
694,080	4,800	.0119	.0030	
723,000	5,000	.0150	.0042	
57,840	400	.0048	....	
115,680	800	.0060	....	
173,520	1,200	.0072	....	
231,360	1,600	.0083	....	
289,200	2,000	.0093	....	
347,040	2,400	.0102	....	
404,880	2,800	.0111	....	
462,720	3,200	.0120	....	
520,560	3,600	.0130	....	
578,400	4,000	.0139	....	First crack.
520,560	3,600	.0136	....	
462,720	3,200	.0131	....	
404,880	2,800	.0125	....	
347,040	2,400	.0119	....	
289,200	2,000	.0112	....	
231,360	1,600	.0104	....	
173,520	1,200	.0095	....	
115,680	800	.0082	....	
57,840	400	.0066	....	
14,460	100	....	.0048	
726,000	5,021	....	....	Ultimate strength.

Marks, 9.
Composition: Alpha cement, 1; sand, 1; broken stone, 3 ($\frac{3}{4}''$ ring stone).
Water used in mortar, 31.40 per cent of cement.
Age, 8 days.
Set in mold 1 day, in water 7 days.
Weight per cubic foot, 147.01 pounds.
Sectional area, 143.88 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,388	100	0.	0.	Initial load.
28,776	200	.0001	0.	
43,164	300	.0002	0.	
57,552	400	.0004	0.	
71,940	500	.0006	.0001	
86,328	600	.0008	.0001	E=3,571,000 pounds per square inch.
100,716	700	.0010	.0002	
115,104	800	.0013	.0003	
129,492	900	.0015	.0004	
143,880	1,000	.0018	.0004	E=3,214,000 pounds per square inch.
158,268	1,100	.0022	.0005	
172,656	1,200	.0024	.0007	
187,044	1,300	.0028	.0008	
201,432	1,400	.0032	.0009	
215,820	1,500	.0036	.0010	
230,208	1,600	.0041	.0012	
244,596	1,700	.0048	.0014	
258,984	1,800	.0061	.0019	
273,372	1,900	.0165	.0044	First crack and ultimate strength.

Marks, 10.
Composition: Alpha cement, 1; sand, 1; broken stone, 3 ($\frac{3}{4}''$ ring stone).
Water used in mortar, 31.40 per cent of cement.
Age, 20 days.
Set in mold 1 day, in water 19 days.
Weight per cubic foot, 150.12 pounds.
Sectional area, 144 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,400	100	0.	0.	Initial load.
28,800	200	.0002	0.	
43,200	300	.0005	.0001	
57,600	400	.0007	.0002	
72,000	500	.0010	.0002	
86,400	600	.0012	.0003	E=2,778,000 pounds per square inch.
100,800	700	.0015	.0004	
115,200	800	.0019	.0006	
129,600	900	.0022	.0006	
144,000	1,000	.0028	.0009	E=2,368,000 pounds per square inch.
172,800	1,200	.0036	.0011	
201,600	1,400	.0043	.0012	E=1,250,000 pounds per square inch.
230,400	1,600	.0055	.0017	
259,200	1,800	.0068	.0021	
288,000	2,000	.0089	.0030	
316,800	2,200	.0117	.0044	
345,600	2,400	.0162	.0071	First crack.
374,400	2.600	.0223	.0109	
398,800	2,769	....	....	Ultimate strength.

Marks, 11.
Composition: Alpha cement, 1; sand, 1; broken stone, 3 ($\frac{3}{4}''$ ring stone).
Water used in mortar, 31.40 per cent of cement.
Age, 32 days.
Set in mold 1 day; in water 31 days.
Weight per cubic foot, 148.27 pounds.
Sectional area, 145.08 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 508	100	0.	0.	Initial load.
29, 016	200	.0001	0.	
43, 524	300	.0001	0.	
58, 032	400	.0002	0.	
72, 540	500	.0003	0.	
87, 048	600	.0003	0.	E=8,333,000 pounds per square inch.
101, 556	700	.0004	0.	
116, 064	800	.0005	0.	
130, 572	900	.0006	0.	
145, 080	1, 000	.0008	0.	E=5,625,000 pounds per square inch.
174, 096	1, 200	.0010	0.	
203, 112	1, 400	.0013	0.	E=3,571,000 pounds per square inch.
232, 128	1, 600	.0016	0.	
261, 144	1, 800	.0018	0.	
290, 160	2, 000	.0021	—.0001	
319, 176	2, 200	.0024	—.0001	
348, 192	2, 400	.0028	—.0001	
377, 208	2, 600	.0035	—.0001	
406, 224	2, 800	.0043	0.	
435, 240	3, 000	.0058	0.	
464, 256	3, 200	....	....	Ultimate strength.

Marks, 12.
Composition: Alpha cement, 1; sand, 1; broken stone, 3 (1″ ring stone).
Water used in mortar, 31.35 per cent of cement.
Age, 7 days.
Set in mold 1 day; in water 6 days.
Weight per cubic foot, 159.26 pounds.
Sectional area, 144.00 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,400	100	0.	0.	Initial load.
28,800	200	.0001	0.	
43,200	300	.0002	0.	
57,600	400	.0003	0.	
72,000	500	.0004	0.	
86,400	600	.0005	0.	E = 5,000,000 pounds per square inch.
100,800	700	.0006	0.	
115,200	800	.0007	0.	
129,600	900	.0009	0.	
144,000	1,000	.0011	0.	E = 4,091,000 pounds per square inch.
172,800	1,200	.0014	.0002	
201,600	1,400	.0018	.0002	E = 3,333,000 pounds per square inch.
230,400	1,600	.0022	.0003	
259,200	1,800	.0026	.0005	
288,000	2,000	.0033	.0007	
316,800	2,200	.0038	.0009	
345,600	2,400	.0047	.0013	
374,400	2,600	.0058	.0017	
403,200	2,800	.0077	.0028	
428,000	....	....	....	First crack.
432,000	3,000	.0095	.0039	
460,800	3,200	.0105	.0042	
488,100	3,390	....	....	Ultimate strength.

Marks, 13.
Composition: Alpha cement, 1; sand, 1; broken stone, 3 (1″ ring stone).
Water used in mortar, 31.35 per cent of cement.
Age, 20 days.
Set in mold 1 day; in water, 19 days.
Weight per cubic foot, 160.65 pounds.
Sectional area, 143.64 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,364	100	0.	0.	Initial load.
28,728	200	.0001	0.	
43,092	300	.0001	0.	
57,456	400	.0002	0.	
71,820	500	.0002	0.	
86,184	600	.0003	0.	E = 8,333,000 pounds per square inch.
100,548	700	.0004	0.	
114,912	800	.0005	0.	
129,276	900	.0006	0.	
143,640	1,000	.0007	0.	E = 6,429,000 pounds per square inch.
172,368	1,200	.0010	.0001	
201,096	1,400	.0012	.0001	E = 5,000,000 pounds per square inch.
229,824	1,600	.0015	.0002	
258,552	1,800	.0017	.0002	
287,280	2,000	.0019	.0002	
316,008	2,200	.0022	.0002	
344,736	2,400	.0025	.0003	
373,464	2,600	.0028	.0003	First crack.
402,192	2,800	.0031	.0003	
430,920	3,000	.0035	.0004	
459,648	3,200	.0038	.0005	
488,376	3,400	.0044	.0006	
517,104	3,600	.0047	.0005	
545,832	3,800	.0051	.0005	
574,560	4,000	.0058	.0002	
611,000	4,254	....	....	Ultimate strength.

Marks, 14.
Composition: Alpha cement, 1; sand, 1; broken stone, 3 (1″ ring stone).
Water used in mortar, 31.35 per cent of cement.
Age, 34 days.
Set in mold 1 day; in water 33 days.
Weight per cubic foot, 160.88 pounds.
Sectional area, 145.32 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,532	100	0.	0.	Initial load.
29,064	200	.0001	0.	
43,596	300	.0002	.0001	
58,128	400	.0003	.0001	
72,660	500	.0004	.0001	
87,192	600	.0005	.0001	E=6,250,000 pounds per square inch.
101,724	700	.0006	.0001	
116,256	800	.0008	.0001	
130,788	900	.0009	.0002	
145,320	1,000	.0010	.0002	E=5,625,000 pounds per square inch.
174,384	1,200	.0013	.0002	
203,448	1,400	.0017	.0003	E=3,571,000 pounds per square inch.
232,512	1,600	.0020	.0004	
261,576	1,800	.0024	.0005	
290,640	2,000	.0028	.0006	
319,704	2,200	.0033	.0006	
348,768	2,400	.0037	.0007	
377,832	2,600	.0042	.0009	First crack.
406,896	2,800	.0048	.0010	
435,960	3,000	.0055	.0013	
465,024	3,200	.0061	.0015	
494,088	3,400	.0072	.0019	
523,152	3,600	.0081	.0023	
552,216	3,800	.0091	.0027	
581,280	4,000	.0102	.0032	
610,844	4,200	.0116	.0038	
639,408	4,400	.0132	.0045	
668,472	4,600	.0151	.0058	
697,536	4,800	.0180	.0076	
714,500	4,917	....	....	Ultimate strength.

Marks, 15.
Composition: Alpha cement, 1; sand, 1; broken stone, 3 (1″ ring stone).
Water used in mortar, 31.35 per cent of cement.
Age, 73 days.
Set in mold 1 day, in water 28 days, in air 44 days.
Weight per cubic foot, 158.54 pounds.
Sectional area, 144.72 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,472	100	0.	0.	Initial load.
28,944	200	.0001	0.	
43,416	300	.0001	0.	
57,888	400	.0002	0.	
72,360	500	.0002	0.	
86,832	600	.0003	0.	E=8,333,000 pounds per square inch.
101,304	700	.0004	0.	
115,776	800	.0006	.0001	
130,248	900	.0008	.0001	
144,720	1,000	.0009	.0001	E=5,625,000 pounds per square inch.
173,664	1,200	.0011	.0001	
202,608	1,400	.0014	.0002	E=4,545,000 pounds per square inch.
231,552	1,600	.0017	.0002	
260,496	1,800	.0019	.0003	
289,440	2,000	.0023	.0004	
318,384	2,200	.0026	.0005	
347,328	2,400	.0029	.0006	
376,272	2,600	.0032	.0006	
405,216	2,800	.0035	.0007	
434,160	3,000	.0038	.0008	
463 104	3,200	.0041	.0008	
492,048	3,400	.0044	.0009	
520,992	3,600	.0048	.0011	
549,936	3,800	.0052	.0012	
578,880	4,000	.0058	.0014	
607,824	4,200	.0063	.0017	
636,768	4,400	.0071	.0020	First crack.
665,712	4,600	.0079	.0023	
694,656	4,800	.0087	.0028	
723,600	5,000	.0097	.0034	
752,544	5,200	.0104	.0040	
763,000	5,272	....	....	Ultimate strength.

Marks, 16.
Composition: Alpha cement, 1; sand, 1; broken stone, 3 (2½" ring stone, 2; ½" ring stone, 1).
Water used in mortar, 29.24 per cent of cement.
Age, 7 days.
Set in mold 1 day, in water 6 days.
Weight per cubic foot, 158.81 pounds.
Sectional area, 144.48 square inches.
Gauged length, 5".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,448	100	0.	0.	Initial load.
28,896	200	.0001	0.	
43,344	300	.0002	0.	
57,792	400	.0003	0.	
72,240	500	.0004	0.	
86,688	600	.0005	0.	E = 5,000,000 pounds per square inch.
101,136	700	.0006	0.	
115,584	800	.0007	0.	
130,032	900	.0008	.0001	
144,480	1,000	.0010	.0001	E = 5,000,000 pounds per square inch.
173,376	1,200	.0013	.0001	
202,272	1,400	.0017	.0002	E = 3,571,000 pounds per square inch.
231,168	1,600	.0020	.0002	
260,064	1,800	.0022	.0003	
288,960	2,000	.0026	.0003	
317,856	2,200	.0031	.0004	
346,752	2,400	.0037	.0006	First crack.
375,648	2,600	.0044	.0009	
404,544	2,800	.0063	.0015	Ultimate strength.

Marks, 17.
Composition: Alpha cement, 1; sand, 1; broken stone, 3 (2½″ ring stone, 2; ½″ ring stone, 1).
Water used in mortar, 29.24 per cent of cement.
Age, 19 days.
Set in mold 1 day, in water 18 days.
Weight per cubic foot, 156.73 pounds.
Sectional area, 144.24 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	.0001	0.	
43,272	300	.0002	0.	
57,696	400	.0003	0.	
72,120	500	.0005	.0001	
86,544	600	.0006	.0001	E = 5,000,000 pounds per square inch.
100,968	700	.0008	.0001	
115,392	800	.0009	.0001	
129,816	900	.0011	.0001	
144,240	1,000	.0012	.0002	E = 4,500,000 pounds per square inch.
173,088	1,200	.0015	.0002	
201,936	1,400	.0018	.0002	E = 3,125,000 pounds per square inch.
230,784	1,600	.0021	.0002	
259,632	1,800	.0026	.0003	
288,480	2,000	.0030	.0004	
317,328	2,200	.0037	.0005	
346,176	2,400	.0042	.0006	
375,024	2,600	.0047	.0007	
403,872	2,800	.0053	.0007	
432,720	3,000	.0061	.0009	
461,568	3,200	.0070	.0010	
490,416	3,400	.0079	.0010	
519,264	3,600	.0086	.0015	First crack.
546,100	3,786	....	....	Ultimate strength.

Composition: Alpha cement, 1; sand, 1; broken stone, 3 (2½″ ring stone, 2; ½″ ring stone, 1).
Water used in mortar, 29.24 per cent of cement.
Age, 34 days.
Set in mold 1 day, in water 33 days.
Weight per cubic foot, 158.91 pounds.
Sectional area, 145.44 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 544	100	0.	0.	Initial load.
29, 088	200	0.	0.	
43, 632	300	.0001	0.	
58, 176	400	.0001	0.	
72, 720	500	.0002	0.	
87, 264	600	.0003	0.	E=8,333,000 pounds per square inch.
101, 808	700	.0004	0.	
116, 352	800	.0005	.0001	
130, 896	900	.0006	.0001	
145, 440	1, 000	.0007	.0001	E=7,500,000 pounds per square inch.
174, 528	1, 200	.0009	.0001	
203, 616	1, 400	.0011	.0001	E=6,250,000 pounds per square inch.
232, 704	1, 600	.0012	.0001	
261, 792	1, 800	.0013	0.	
290, 880	2, 000	.0014	0.	
319, 968	2, 200	.0014	0.	
349, 056	2, 400	.0015	0.	
378, 144	2, 600	.0016	0.	
407, 232	2, 800	.0016	—.0001	
436, 320	3, 000	.0017	—.0002	
405, 408	3, 200	.0017	—.0007	
494, 496	3, 400	.0017	—.0009	First crack.
523, 584	3, 600	.0018	—.0012	
552, 672	3, 800	.0020	—.0019	
581, 760	4, 000	.0023	—.0029	
610, 848	4, 200	.0032	—.0037	
632, 500	4, 349	....	....	Ultimate strength.

Marks, 19.
Composition: Alpha cement, 1; $\frac{1}{8}''$ sand, 1; broken stone, 3 ($2\frac{1}{2}''$ ring stone, 2; $\frac{1}{2}''$ ring stone, 1).
Water used in mortar, 29.24 per cent of cement.
Age, 74 days.
Set in mold 1 day, in water 28 days, in air 45 days.
Weight per cubic foot, 159.35 pounds.
Sectional area, 144.84 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 484	100	0.	0.	Initial load.
28, 968	200	.0001	0.	
43, 452	300	.0001	0.	
57, 936	400	.0002	0.	
72, 420	500	.0003	0.	
86, 904	600	.0004	0.	E = 6,250,000 pounds per square inch.
101, 388	700	.0005	.0001	
115, 872	800	.0007	.0001	
130, 356	900	.0008	.0001	
144. 840	1, 000	.0009	.0001	E = 5,625,000 pounds per square inch.
173, 808	1, 200	.0011	.0001	
202, 776	1, 400	.0014	.0002	E = 4,167,000 pounds per square inch.
231, 744	1, 600	.0017	.0003	
260, 712	1, 800	.0020	.0003	
289, 680	2, 000	.0024	.0004	
318, 648	2, 200	.0028	.0006	
347, 616	2, 400	.0032	.0007	
376, 584	2, 600	.0037	.0009	
405, 552	2, 800	.0042	.0010	
434, 520	3, 000	.0046	.0013	
463, 488	3, 200	.0054	.0015	
492, 456	3, 400	.0062	.0019	
521, 424	3, 600	.0070	.0022	
550, 392	3, 800	.0079	.0025	
579, 360	4, 000	.0091	.0032	First crack.
608, 328	4, 200	.0107	.0040	
637, 296	4, 400	.0132	.0054	
658, 200	4, 544	…………	…………	Ultimate strength.

Marks, 20.

Composition: Alpha cement, 1; sand, 1; broken stone, 3 (2½″ ring stone, 1; 1″ ring stone, 1; ½″ ring stone, 1).

Water used in mortar, 31.50 per cent of cement.

Age, 7 days.

Set in mold 1 day, in water 6 days.

Weight per cubic foot, 158.18 pounds.

Sectional area, 144.36 square inches.

Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14.436	100	0.	0.	Initial load.
28,872	200	.0001	0.	
43,308	300	.0002	0.	
57,744	400	.0004	0.	
72,180	500	.0006	.0001	
86,616	600	.0007	.0001	E = 4,167,000 pounds per square inch.
101,052	700	.0009	.0002	
115,488	800	.0011	.0002	
129,924	900	.0013	.0002	
144,360	1,000	.0016	.0003	E = 3,461,000 pounds per square inch.
173.232	1,200	.0022	.0005	
202,104	1,400	.0028	.0008	E = 2,174,000 pounds per square inch.
230,976	1,600	.0036	.0011	
259,848	1,800	.0044	.0015	
288,720	2,000	.0057	.0021	
317,592	2,200	.0073	.0030	
346,464	2,400	.0095	.0043	
375,336	2,600	.0122	.0061	
369,000	....	....	....	First crack.
404,208	2,800	....	....	Ultimate strength.

Marks, 21.
Composition: Alpha cement, 1; sand, 1; broken stone, 3 (2½″ ring stone, 1; 1″ ring stone, 1; ½″ ring stone, 1).
Water used in mortar, 31.50 per cent of cement.
Age, 19 days.
Set in mold 1 day, in water 18 days.
Weight per cubic foot, 159.76 pounds.
Sectional area, 144.84 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,484	100	0.	0.	Initial load.
28,968	200	.0001	0.	
43,452	300	.0001	0.	
57,936	400	.0002	0.	
72,420	500	.0003	0.	
86,904	600	.0004	0.	E=6,250,000 pounds per square inch.
101,388	700	.0006	0.	
115,872	800	.0007	0.	
130,356	900	.0008	0.	
144,840	1,000	.0010	0.	E=4,500,000 pounds per square inch.
173,808	1,200	.0013	.0001	
202,776	1,400	.0015	.0001	E=4,167,000 pounds per square inch.
231,744	1,600	.0018	.0002	
260,712	1,800	.0021	.0003	
289,680	2,000	.0025	.0003	
318,648	2,200	.0030	.0005	
347,616	2,400	.0034	.0005	
376,584	2,600	.0038	.0007	
405,552	2,800	.0042	.0008	
434,520	3,000	.0051	.0011	
463,488	3,200	.0058	.0013	
492,456	3,400	.0068	.0018	First crack.
521,424	3,600	.0080	.0023	
550,392	3,800	.0091	.0030	
579.360	4,000	.0112	.0047	
602,000	4,156	....	....	Ultimate strength.

Marks, 22.

Composition: Alpha cement, 1; sand, 1; broken stone, 3 (2½″ ring stone, 1; 1″ ring stone, 1; ½″ ring stone, 1).

Water used in mortar, 31.50 per cent of cement.

Age, 34 days.

Set in mold 1 day, in water 33 days.

Weight per cubic foot, 159.38 pounds.

Sectional area, 145.32 square inches.

Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,532	100	0.	0.	Initial load.
29,064	200	0.	0.	
43,596	300	.0001	0.	
58,128	400	.0002	0.	
72,660	500	.0002	0.	
87,192	600	.0003	0.	E = 8,333,000 pounds per square inch.
101,724	700	.0004	0.	
116,256	800	.0005	0.	
130,788	900	.0006	0.	
145,320	1,000	.0008	0.	E = 5,625,000 pounds per square inch.
174,384	1,200	.0010	0.	
203,448	1,400	.0013	.0001	E = 5,555,000 pounds per square inch.
232,512	1,600	.0014	.0001	
261,576	1,800	.0016	.0001	
290,640	2,000	.0018	.0001	
319,704	2,200	.0021	.0001	
348,768	2,400	.0023	.0002	
377,832	2,600	.0026	.0002	
406,896	2,800	.0029	.0003	
435,960	3,000	.0033	.0004	
465,024	3,200	.0036	.0005	
494,088	3,400	.0041	.0006	
523,152	3,600	.0046	.0008	
552,216	3,800	.0052	.0009	First crack.
581,280	4,000	.0059	.0012	
610,344	4,200	.0065	.0014	
639,408	4,400	.0076	.0018	
668,472	4,600	.0083	.0020	
697,536	4,800	.0062	.0007	Ultimate strength.

Marks, 23.

Composition: Alpha cement, 1; $\frac{1}{8}''$ sand, 1; broken stone 3 ($2\frac{1}{2}''$ ring stone, 1; 1″ ring stone, 1; $\frac{1}{2}''$ ring stone, 1).

Water used in mortar, 31.50 per cent of cement.

Age, 73 days.

Set in mold 1 day, in water 28 days, in air 44 days.

Weight per cubic foot, 161.91 pounds.

Sectional area, 144.36 square inches.

Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,436	100	0.	0.	Initial load.
28,872	200	.0001	0.	
43,308	300	.0001	0.	
57,744	400	.0002	0.	
72,180	500	.0002	0.	
86,616	600	.0003	0.	E = 8,333,000 pounds per square inch.
101,052	700	.0003	0.	
115,488	800	.0004	0.	
129,924	900	.0005	0.	
144,360	1,000	.0006	0.	E = 7,500,000 pounds per square inch.
173,232	1,200	.0007	0.	
202,104	1,400	.0009	0.	E = 6,250,000 pounds per square inch.
230,976	1,600	.0011	.0001	
259,848	1,800	.0013	.0001	
288,720	2,000	.0015	.0001	
317,592	2,200	.0017	.0002	
346,464	2,400	.0019	.0002	
375,336	2,600	.0022	.0002	
404,208	2,800	.0024	.0003	
433,080	3,000	.0026	.0003	
461,952	3,200	.0028	.0003	
490,824	3,400	.0030	.0003	
519,696	3,600	.0033	.0004	
548,568	3,800	.0036	.0005	
577,440	4,000	.0038	.0006	
606,312	4,200	.0042	.0007	
635,184	4,400	.0044	.0008	
664,056	4,600	.0047	.0009	
692,928	4,800	.0050	.0010	
721,800	5,000	.0054	.0011	
750,672	5,200	.0060	.0013	Corner cracked.
779,544	5,400	.0063	.0014	
800,000	5,542	.0066	.0015	Maximum load applied. Ultimate strength of cube not reached.

Marks, 24.
Composition: "Steel" Portland cement, 1; sand, 1; broken stone, 3 ($\frac{3}{4}''$ ring stone).
Water used in mortar, 36.75 per cent.
Age, 7 days.
Set in mold 1 day, in water, 6 days.
Weight per cubic foot, 151.86 pounds.
Sectional area, 143.88 square inches.
Gauged length, 5".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,388	100	0.	0.	Initial load.
28,776	200	.0002	0.	
43,164	300	.0006	.0001	
57,552	400	.0011	.0004	
71,940	500	.0018	.0009	
86,328	600	.0032	.0019	E = 1,923,000 pounds per square inch.
100,716	700	.0044	.0027	
115,104	800	.0061	.0040	
129,492	900	.0083	.0056	
143,880	1,000	.0104	.0072	E = 1,406,000 pounds per square inch.
158,268	1,100	.0140	.0101	
172,656	1,200	.0182	.0139	
187,044	1,300	.0240	.0192	First crack.
202,600	1,408	....	....	Ultimate strength.

Marks, 25.
Composition: "Steel" Portland cement, 1; sand, 1; broken stone, 3 ($\frac{3}{4}''$ ring stone).
Water used in mortar, 36.75 per cent of cement.
Age, 21 days.
Set in mold 1 day, in water 20 days.
Weight per cubic foot, 154.02 pounds.
Sectional area, 144.48 square inches.
Gauged length, 5".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,448	100	0.	0.	Initial load.
28,896	200	.0001	0.	
43,344	300	.0002	0.	
57,792	400	.0004	0.	
72,240	500	.0006	.0001	
86,688	600	.0009	.0001	E = 3,125,000 pounds per square inch.
101,136	700	.0011	.0002	
115,584	800	.0014	.0003	
130,032	900	.0019	.0005	
144,480	1,000	.0024	.0009	E = 3,000,000 pounds per square inch.
173,376	1,200	.0041	.0018	
202,272	1,400	.0071	.0040	
231,168	1,600	.0111	.0068	First crack.
260,064	1,800	.0165	.0110	
286,100	1,980	....	....	Ultimate strength.

Marks, 26.
Composition: "Steel" Portland cement, 1; sand, 1; broken stone, 3 (¾″ ring stone).
Water used in mortar, 36.75 per cent of cement.
Age, 31 days.
Set in mold 1 day, in water 30 days.
Weight per cubic foot, 150.13 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	.0001	0.	
43,380	300	.0003	0.	
57,840	400	.0005	0.	
72,300	500	.0007	.0001	
86,760	600	.9009	.0001	E=3,125,000 pounds per square inch.
101,220	700	.0013	.0002	
115,680	800	.0016	.0003	
130,140	900	.0021	.0006	
144,600	1,000	.0029	.0011	E=2,500,000 pounds per square inch.
173,520	1,200	.0050	.0023	
202,440	1,400	.0086	.0049	
231,360	1,600	.0154	.0102	First crack.
248,100	1,716	....	....	Ultimate strength.

Marks, 27.
Composition: "Steel" Portland cement, 1; sand, 1; broken stone, 3 (¾″ ring stone).
Water used in mortar, 36.75 per cent of cement.
Age, 70 days.
Set in mold 1 day, in water 69 days.
Weight per cubic foot, 155.91 pounds.
Sectional area, 145.08 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,508	100	0.	0.	Initial load.
29,016	200	.0001	0.	
43,524	300	.0002	0.	
58,032	400	.0003	0.	
72,540	500	.0005	0.	
87,048	600	.0007	0.	E=3,571,000 pounds per square inch.
101,556	700	.0009	.0001	
116,064	800	.0012	.0001	
130,572	900	.0014	.0002	
145,080	1,000	.0019	.0004	E=3,000,000 pounds per square inch.
174,096	1,200	.0030	.0009	
203,112	1,400	.0047	.0021	E=1,282,000 pounds per square inch.
232,128	1,600	.0075	.0041	
261,144	1,800	.0113	.0070	
290,160	2,000	.0171	.0117	
319,176	2,200	.0238	.0173	
330,000	....	....	....	First crack.
357,500	2,464	....	....	Ultimate strength.

Marks, 28.
Composition: "Standard" Portland cement, 1; sand, 1; broken stone, 3 ($\frac{3}{4}''$ ring stone).
Water used in mortar, 41.18 per cent of cement.
Age, 7 days.
Set in mold 1 day, in water 6 days.
Weight per cubic foot, 151.37 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	.0004	.0001	
43,380	300	.0014	.0009	
57,840	400	.0032	.0022	
72,300	500	.0062	.0047	
86,760	600	.0107	.0082	E = 1,000,000 pounds per square inch.
101,220	700	.0156	.0125	
115,680	800	.0237	.0196	First crack.
142,100	983	....	....	Ultimate strength.

Marks, 29.
Composition: "Standard" Portland cement, 1; sand, 1; broken stone, 3 ($\frac{3}{4}''$ ring stone).
Water used in mortar, 41.18 per cent of cement.
Age, 22 days.
Set in mold 1 day, in water 21 days.
Weight per cubic foot, 152.86 pounds.
Sectional area, 145.92 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,592	100	0.	0.	Initial load.
29,184	200	.0002	0.	
43,776	300	.0007	.0002	
58,368	400	.0013	.0006	
72,960	500	.0023	.0013	
87,552	600	.0039	.0024	E = 1,667,000 pounds per square inch.
102,144	700	.0062	.0042	
116,736	800	.0091	.0065	
131,328	900	.0138	.0103	First crack.
145,920	1,000	.0188	.0146	
160,512	1,100	.0247	.0199	
195,700	1,341	....	....	Ultimate strength.

Marks, 30.
Composition: "Standard" Portland cement, 1; sand, 1; broken stone, 3 (¾" ring stone).
Water used in mortar, 41.18 per cent of cement.
Age, 30 days.
Set in mold 1 day, in water 29 days.
Weight per cubic foot 156.13 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	.0001	0.	
43,380	300	.0002	0.	
57,840	400	.0004	.0001	
72,300	500	.0007	.0001	
86,760	600	.0009	.0002	E = 3,571,000 pounds per square inch.
101,220	700	.0013	.0003	
115,680	800	.0018	.0006	
130,140	900	.0024	.0009	
144,600	1,000	.0036	.0016	E = 2,250,000 pounds per square inch.
173,520	1,200	.0098	.0063	
202,440	1,400	.0237	.0177	
215,200	1,488	....	....	Ultimate strength.

Marks, 31.
Composition: "Standard" Portland cement, 1; sand, 1; broken stone, 3 (¾" ring stone).
Water used in mortar, 41.18 per cent of cement.
Age, 70 days.
Set in mold 1 day, in water 69 days.
Weight per cubic foot, 155.98 pounds.
Sectional area, 145.44 square inches.
Gauged length, 5".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,544	100	0.	0.	Initial load.
29,088	200	.0003	.0001	
43,632	300	.0008	.0003	
58,176	400	.0012	.0006	
72,720	500	.0016	.0007	
87,264	600	.0021	.0010	E = 2,273,000 pounds per square inch.
101,808	700	.0026	.0013	
116,352	800	.0032	.0016	
130,896	900	.0039	.0020	
145,440	1,000	.0046	.0025	E = 2,143,000 pounds per square inch.
174,528	1,200	.0072	.0041	
203,616	1,400	0106	.0064	
232,704	1,600	.0158	.0103	
261,792	1,800	.0232	.0167	Corner cracked.
300,100	2,063	....	....	Ultimate strength.

Marks, 32.
Composition: "Star" Portland cement, 1; sand, 1; broken stone, 3 (¾″ ring stone).
Water used in mortar, 31.31 per cent.
Age, 7 days.
Set in mold 1 day, in water 6 days.
Weight per cubic foot, 153.85 pounds.
Sectional area, 144.72 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,472	100	0.	0.	Initial load.
28,944	200	.0001	0.	
43,416	300	.0002	0.	
57,888	400	.0003	0.	
72,360	500	.0004	.0001	
86,832	600	.0006	.0001	E=5,000,000 pounds per square inch.
101,304	700	.0008	.0001	
115,776	800	.0011	.0002	
130,248	900	.0013	.0003	
144,720	1,000	.0017	.0005	E=3,750,000 pounds per square inch.
159,192	1,100	.0022	.0006	
173,664	1,200	.0024	.0007	
188,136	1,300	.0029	.0008	
202,608	1,400	.0032	.0010	
217,080	1,500	.0037	.0011	E=1,163,000 pounds per square inch.
231,552	1,600	.0043	.0013	
260,496	1,800	.0065	.0024	
289,440	2,000	.0099	.0044	
318,384	2,200	.0192	.0116	First crack.
330,000	2,342	....	....	Ultimate strength.

Marks, 33.
Composition: "Star" Portland cement, 1; sand, 1; broken stone, 3 (¾″ ring stone).
Water used in mortar, 31.31 per cent of cement.
Age, 22 days.
Set in mould 1 day, in water 21 days.
Weight per cubic foot, 151.01 pounds.
Sectional area, 144.96 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,496	100	0.	0.	Initial load.
28,992	200	.0001	0.	
43,488	300	.0002	0.	
57,984	400	.0003	0.	
72,480	500	.0005	0.	
86,976	600	.0007	0.	E=3,571,000 pounds per square inch.
101,472	700	.0009	.0001	
115,968	800	.0011	.0001	
130,464	900	.0013	.0002	
144,960	1,000	.0017	.0004	E=3,461,000 pounds per square inch.
173,952	1,200	.0026	.0008	
202,944	1,400	.0037	.0012	E=1,136,000 pounds per square inch.
231,936	1,600	.0050	.0019	
260,928	1,800	.0072	.0030	
289,920	2,000	.0116	.0059	
318,912	2,200	....	....	Ultimate strength.

Marks, 34.
Composition: "Star" Portland cement, 1; sand, 1; broken stone, 3 (¾″ ring stone).
Water used in mortar, 31.31 per cent of cement.
Age, 31 days.
Set in mold 1 day, in water 30 days.
Weight per cubic foot, 156.59 pounds.
Sectional area, 144.24 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	.0001	0.	
43,272	300	.0002	0.	
57,696	400	.0003	0.	
72,120	500	.0004	0.	
86,544	600	.0005	0.	E=500,000 pounds per square inch.
100,968	700	.0006	.0001	
115,392	800	.0008	.0001	
129,816	900	.0010	.0001	
144,240	1,000	.0011	.0001	E=4,500,000 pounds per square inch.
173,088	1,200	.0013	.0001	
201,936	1,400	.0016	.0001	E=3,333,000 pounds per square inch.
230,784	1,600	.0020	.0002	
259,632	1,800	.0024	.0002	
288,480	2,000	.0028	.0003	
317,328	2,200	.0033	.0004	
346,176	2,400	.0038	.0005	
375,024	2,600	.0042	.0006	
403,872	2,800	.0049	.0007	
432,720	3,000	.0061	.0011	
461,568	3,200	.0077	.0018	First crack.
490,416	3,400	.0114	.0037	
491,000	3,404	....	....	Ultimate strength.

Marks, 35.
Composition: "Star" Portland cement, 1; sand, 1; broken stone, 3 ($\frac{3}{4}''$ ring stone).
Water used in mortar, 31.31 per cent of cement.
Age, 69 days.
Set in mold, 1 day; in water, 68 days.
Weight per cubic foot, 160.33 pounds.
Sectional area, 144.96 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,496	100	0.	0.	Initial load.
28,992	200	.0001	0.	
43,488	300	.0001	0.	
57,984	400	.0002	0.	
72,480	500	.0003	0.	
86,976	600	.0004	0.	E = 6,250,000 pounds per square inch.
101,472	700	.0006	0.	
115,968	800	.0007	.0001	
130,464	900	.0008	.0001	
144,960	1,000	.0010	.0001	E = 5,000,000 pounds per square inch.
173,952	1,200	.0012	.0002	
202,944	1,400	.0014	.0003	E = 4,167,000 pounds per square inch.
231,936	1,600	.0018	.0003	
260,928	1,800	.0022	.0004	
289,920	2,000	.0026	.0005	
318,912	2,200	.0030	.0006	
347,904	2,400	.0034	.0007	
376,896	2.600	.0039	.0009	
405,888	2,800	.0045	.0010	
434,880	3,000	.0051	.0013	
463,872	3,200	.0062	.0018	
492,864	3,400	.0068	.0021	
521,856	3,600	.0079	.0027	
550,848	3,800	.0090	.0032	
579,840	4,000	.0102	.0037	
608,832	4,200	.0118	.0048	
637,824	4,400	.0138	.0058	First crack.
666,816	4,600	.0164	.0073	
672,000	4,636	....	....	Ultimate strength.

Water used in mortar, 35.10 per cent of cement.
Age, 7 days.
Set in mold 1 day, in water 6 days.
Weight per cubic foot, 146.76 pounds.
Sectional area, 144.48 square inches.
Gauged length, 5″

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,448	100	0.	0.	Initial load.
28,896	200	.0002	0.	
43,344	300	.0004	0.	
57,792	400	.0006	.0001	
72,240	500	.0009	.0001	
86,688	600	.0012	.0001	E = 2,273,000 pounds per square inch.
101,136	700	.0017	.0003	
115,584	800	.0021	.0005	
130,032	900	.0029	.0008	
144,480	1,000	.0034	.0009	E = 1,800,000 pounds per square inch.
173,376	1,200	.0082	.0040	First crack.
187,600	1,298	....	....	Ultimate strength.

Marks, 37.
Composition: Alpha cement, 1; fine sand, 1; ⅜″ pebbles, 3.
Water used in mortar, 35.10 per cent of cement.
Age, 21 days.
Set in mold 1 day, in water 20 days.
Weight per cubic foot, 150.51 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	.0001	0.	
43,380	300	.0002	0.	
57,840	400	.0003	0.	
72,300	500	.0005	0.	
86,760	600	.0007	0.	E = 3,571,000 pounds per square inch.
101,220	700	.0009	.0001	
115,680	800	.0011	.0001	
130,140	900	.0013	.0002	
144,600	1,000	.0015	.0003	E = 3,750,000 pounds per square inch.
173,520	1,200	.0019	.0003	
202,440	1,400	.0022	.0003	E = 2,778,000 pounds per square inch
231,360	1,600	.0027	.0004	
260,280	1,800	.0030	.0004	
289,200	2,000	.0033	.0003	
318,120	2,200	.0037	.0002	
347,040	2,400	.0048	—.0001	
375,960	2,600	.0034	....	First crack and ultimate strength.

Marks, 38.
Composition: Alpha cement, 1; fine sand, 1; ⅜″ pebbles, 3.
Water used in mortar, 35.10 per cent of cement.
Age, 34 days.
Set in mold 1 day, in water 33 days.
Weight per cubic foot, 147.02 pounds.
Sectional area, 145.68 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,568	100	0.	0.	Initial load.
29,136	200	.0001	0.	
43,704	300	.0002	0.	
58,272	400	.0003	0.	
72,840	500	.0004	0.	
87,408	600	.0007	.0001	E = 4,167,000 pounds per square inch.
101,976	700	.0009	.0001	
116,544	800	.0011	.0001	
131,112	900	.0013	.0002	
145,680	1,000	.0015	.0002	E = 3,461,000 pounds per square inch.
174,816	1,200	.0019	.0003	
203,952	1,400	.0025	.0004	
233,088	1,600	.0031	.0006	
262,224	1,800	.0036	.0008	
291,360	2,000	.0042	.0010	
320,496	2,200	.0050	.0014	
349,632	2,400	.0060	.0017	
378,768	2,600	.0076	.0023	
407,904	2,800	.0101	.0038	
435,900	2,993	....	....	Ultimate strength.

Water used in mortar, 35.10 per cent of cement.
Age, 70 days.
Set in mold 1 day, in water 69 days.
Weight per cubic foot, 148.76 pounds.
Sectional area, 145.20 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,520	100	0.	0.	Initial load.
29,040	200	.0001	0.	
43,560	300	.0002	0.	
58,080	400	.0005	.0001	
72,600	500	.0007	.0001	
87,120	600	.0009	.0001	E = 3,125,000 pounds per square inch.
101,640	700	.0011	.0001	
116,160	800	.0012	.0001	
130,680	900	.0014	.0002	
145,200	1,000	.0016	.0002	E = 3,214,000 pounds per square inch.
174,240	1,200	.0020	.0003	
203,280	1,400	.0023	.0003	E = 3,333,000 pounds per square inch.
232,320	1,600	.0028	.0004	
261,360	1,800	.0032	.0005	
290,400	2,000	.0036	.0007	
319,440	2,200	.0040	.0007	
348,480	2,400	.0044	.0008	
377,520	2,600	.0049	.0009	
406,560	2,800	.0053	.0011	
435,600	3,000	.0059	.0012	
464,640	3,200	.0063	.0012	
493,680	3,400	.0072	.0015	
522,720	3,600	.0081	.0017	
551,760	3,800	.0092	.0019	
562,000	3,870	....	....	Ultimate strength.

Marks, 42.
Composition: Alpha cement, 1; fine sand, 1; broken stone, 3 (2½'' ring stone, 2; ¼'' gravel, 1).
Water used in mortar, 21.25 per cent of cement.
Age, 7 days.
Set in mold 1 day, in water 6 days.
Weight per cubic foot, 155.93 pounds.
Sectional area, 144.24 square inches.
Gauged length, 5''.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	.0001	0.	
43,272	300	.0002	0.	
57,696	400	.0004	0.	
72,120	500	.0006	.0001	
86,544	600	.0008	.0001	E=3,571,000 pounds per square inch.
100,968	700	.0010	.0002	
115,392	800	.0013	.0003	
129,816	900	.0016	.0004	
144,240	1,000	.0020	.0005	E=3,000,000 pounds per square inch.
173,088	1,200	.0028	.0007	
201,936	1,400	.0040	.0011	
230,784	1,600	.0066	.0025	
259,632	1,800	....	....	First crack and ultimate strength.

Marks, 43.
Composition: Alpha cement, 1; fine sand, 1; broken stone, 3; (2½″ ring stone, 2; ¼″ gravel, 1).
Water used in mortar, 21.25 per cent of cement.
Age, 23 days.
Set in mold 1 day, in water 22 days.
Weight per cubic foot, 157.24 pounds.
Sectional area, 144.24 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	.0001	0.	
43,272	300	.0002	0.	
57,696	400	.0003	0.	
72,120	500	.0004	0.	
86,544	600	.0005	.0001	E = 6,250,000 pounds per square inch.
100,968	700	.0007	.0001	
115,392	800	.0008	.0001	
129,816	900	.0010	.0002	
144,240	1,000	.0011	.0002	E = 5,000,000 pounds per square inch.
173,088	1,200	.0015	.0003	
201,936	1,400	.0020	.0005	E = 3,125,000 pounds per square inch.
230,784	1,600	.0024	.0007	
259,632	1,800	.0028	.0008	
288,480	2,000	.0033	.0008	
317,328	2,200	.0037	.0009	
346,176	2,400	.0043	.0011	
375,024	2,600	.0048	.0013	
403,872	2,800	.0054	.0015	
432,720	3,000	.0063	.0019	
461,568	3,200	.0075	.0023	
490,416	3,400	.0087	.0029	
519,264	3,600	.0105	.0039	First crack.
548,112	3,800	.0168	.0082	
549.000	3,806	....	....	Ultimate strength.

Marks, 44.
Composition: Alpha cement, 1; fine sand, 1; broken stone, 3 (2½″ ring stone, 2; ¼″ gravel, 1).
Water used in mortar, 21.25 per cent of cement.
Age, 32 days.
Set in mold 1 day, in water 31 days.
Weight per cubic foot, 160.53 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	.0001	0.	
43,236	300	.0001	0.	
57,648	400	.0002	0.	
72,060	500	.0003	0.	
86,472	600	.0004	0.	E = 6,250,000 pounds per square inch.
100,884	700	.0004	0.	
115,296	800	.0006	0.	
129,708	900	.0007	0.	
144,120	1,000	.0008	0.	E = 5,625,000 pounds per square inch.
172,944	1,200	.0010	0.	
201,768	1,400	.0012	0.	E = 5,000,000 pounds per square inch.
230,592	1,600	.0014	—.0001	
259,416	1,800	.0015	—.0001	
288,240	2,000	.0017	—.0001	
317,064	2,200	.0018	—.0001	
345,888	2,400	.0020	—.0001	
374,712	2,600	.0023	—.0001	
403,536	2,800	.0025	—.0001	
432,360	3,000	.0028	0.	
461,184	3,200	.0031	0.	
490,008	3,400	.0034	+.0001	
518,832	3,600	.0037	.0001	
547,656	3,800	.0041	.0001	
576,480	4,000	.0045	.0002	
605,304	4,200	.0049	.0002	
634,128	4,400	.0054	.0003	
662,952	4,600	.0061	.0004	
691,776	4,800	.0071	.0006	First crack.
720,600	5,000	.0074	.0011	
724,100	5,024	....	....	Ultimate strength.

Marks, 45.

Composition: Alpha cement, 1; fine sand, 1; broken stone, 3 (2½″ ring stone, 2; ¼″ gravel, 1).

Water used in mortar, 21.25 per cent of cement.

Age, 67 days.

Set in mold 1 day, in water 66 days.

Weight per cubic foot, 158.26 pounds.

Sectional area, 144.24 square inches.

Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	0.	0.	
43,272	300	.0001	0.	
57,696	400	.0001	0.	
72,120	500	.0002	0.	
86,544	600	.0002	0.	E = 12,500,000 pounds per square inch.
100,968	700	.0004	0.	
115,392	800	.0005	0.	
129,816	900	.0006	0.	
144,240	1,000	.0007	0.	E = 6,429,000 pounds per square inch.
173,088	1,200	.0009	0.	
201,936	1,400	.0011	0.	E = 5,555,000 pounds per square inch.
230,784	1,600	.0013	0.	
259,632	1,800	.0015	0.	
288,480	2,000	.0016	0.	
317,328	2,200	.0018	0.	
346,176	2,400	.0020	0.	
375,024	2,600	.0022	0.	
403,872	2,800	.0024	0.	
432,720	3,000	.0027	.0001	
461,568	3,200	.0031	.0002	Corner cracked.
490,416	3,400	.0036	.0003	
519,264	3,600	.0041	.0005	
548,112	3,800	.0047	.0007	
576,960	4,000	.0056	.0010	
605,808	4,200	.0071	.0013	
634,656	4,400	.0091	.0021	
663,504	4,600	.0137	.0040	
678,000	4,700	....	....	Ultimate strength.

Marks, 46.
Composition: Alpha cement, 1; fine sand, 1; $1\frac{1}{2}''$ pebbles, 3.
Water used in mortar, 29.74 per cent of cement.
Age, 7 days.
Set in mold 1 day, in water 6 days.
Weight per cubic foot, 149.63 pounds.
Sectional area, 144.96 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,496	100	0.	0.	Initial load.
28,992	200	.0001	0.	
43,488	300	.0003	0.	
57,984	400	.0004	0.	
72,480	500	.0006	.0001	
86,976	600	.0008	.0001	E = 3,571,000 pounds per square inch.
101,472	700	.0010	.0002	
115,968	800	.0012	.0002	
130,464	900	.0013	.0003	
144,960	1,000	.0016	.0004	E = 3,750,000 pounds per square inch.
173,952	1,200	.0021	.0005	
202,944	1,400	.0029	.0008	E = 1,562,000 pounds per square inch.
231,936	1,600	.0038	.0011	
260,928	1,800	.0050	.0016	
389,920	2,000	.0066	.0022	
329,900	2,276	....	....	Ultimate strength.

Marks, 47.
Composition: Alpha cement, 1; fine sand, 1; stone, 3 ($1\frac{1}{2}''$ pebbles).
Water used in mortar, 29.74 per cent of cement.
Age, 22 days.
Set in mold 1 day, in water 21 days.
Weight per cubic foot, 151.75 pounds.
Sectional area, 145.32 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,532	100	0.	0.	Initial load.
29,064	200	.0001	0.	
43,596	300	.0002	0.	
58,128	400	.0003	0.	
72,660	500	.0004	0.	
87,192	600	.0005	0.	E = 5,000,000 pounds per square inch.
101,724	700	.0007	0.	
116,256	800	.0009	0.	
130,788	900	.0010	0.	
145,320	1,000	.0012	.0001	E = 4,091,000 pounds per square inch.
174,384	1,200	.0016	.0001	
203.448	1,400	.0020	.0002	E = 2,941,000 pounds per square inch.
232,512	1,600	.0023	.0003	
261,576	1,800	.0027	.0003	
290,640	2,000	.0032	.0004	
319,704	2,200	.0038	.0006	
348,768	2,400	.0044	.0007	
377,832	2,600	.0051	.0010	
406,896	2,800	.0061	.0013	
435,960	3,000	.0076	.0017	
463,000	3,186	....	....	Ultimate strength.

Marks, 48.
Composition: Alpha cement, 1; fine sand, 1; stone, 3 (1½″ pebbles).
Water used in mortar, 29.74 per cent of cement.
Age, 29 days.
Set in mold 1 day, in water 28 days.
Weight per cubic foot, 151.51 pounds.
Sectional area, 145.44 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,544	100	0.	0.	Initial load.
29,088	200	.0001	0.	
43,632	300	.0002	0.	
58,176	400	.0003	.0001	
72.720	500	.0006	.0001	
87,264	600	.0007	.0001	E=4,167,000 pounds per square inch.
101,808	700	.0009	.0001	
116,352	800	.0011	.0002	
130,896	900	.0012	.0002	
145,440	1,000	.0014	.0002	E=3,750,000 pounds per square inch.
174,528	1,200	.0017	.0003	
203,616	1,400	.0022	.0004	E=3,125,000 pounds per square inch.
232,704	1,600	.0025	.0005	
261,792	1,800	.0031	.0006	
290,880	2,000	.0036	.0008	
319,968	2,200	.0042	.0009	
349,056	2,400	.0047	.0011	
378,144	2,600	.0051	.0011	Corner cracked.
407,232	2,800	.0055	.0012	
436,320	3,000	.0061	.0013	
465,408	3,200	.0068	.0015	
494,496	3,400	.0076	.0018	
523,584	3,600	.0084	.0022	
552,672	3,800	.0083	.0024	Cracks in vicinity of the micrometor.
555,200	3,817	....	....	Ultimate strength.

Marks, 49.
Composition: Alpha cement, 1; fine sand, 1; 1½″ pebbles, 3.
Water used in mortar, 29.74 per cent of cement.
Age, 61 days.
Set in mold 1 day, in water 60 days.
Weight per cubic foot, 150.89 pounds.
Sectional area, 145.20 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,520	100	0.	0.	Initial load.
29,040	200	.0001	0.	
43,560	300	.0003	0.	
58,080	400	.0005	0.	
72,600	500	.0007	.0001	
87,120	600	.0010	.0001	E = 2,778,000 pounds per square inch.
101,640	700	.0012	.0003	
116,160	800	.0015	.0003	
130,680	900	.0017	.0004	
145,200	1,000	.0020	.0005	E = 3,000,000 pounds per square inch.
174,240	1,200	.0027	.0007	
203,280	1,400	.0034	.0008	E = 1,724,000 pounds per square inch.
232,320	1,600	.0040	.0010	
261,360	1,800	.0046	.0010	
290,400	2,000	.0054	.0010	
319,440	2,200	.0060	.0010	
348,480	2,400	.0070	.0012	
377,520	2,600	.0084	.0018	
406,560	2,800	.0099	.0022	
435,600	3,000	.0118	.0031	Corner cracked.
464,640	3,200	.0141	.0041	
493,680	3,400	.0170	.0054	
522,720	3,600	.0205	.0070	
551,760	3,800	.0250	.0095	
583,500	4,018	....	....	Ultimate strength.

Marks, 50.
Composition: Alpha cement, 1; fine sand, 1; pebbles, 3 (1½″ pebbles, 2; ⅜″ pebbles, 1).
Water used in mortar, 32.31 per cent of cement.
Age, 8 days.
Set in mold 1 day, in water 7 days.
Weight per cubic foot, 148.26 pounds.
Sectional area, 145.32 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,532	100	0.	0.	Initial load.
29,064	200	.0001	0.	
43,596	300	.0003	0.	
58,128	400	.0005	.0001	
72,660	500	.0008	.0001	
87,192	600	.0010	.0002	E=3,125,000 pounds per square inch.
101,724	700	.0012	.0002	
116,256	800	.0015	.0003	
130,788	900	.0018	.0004	
145,320	1,000	.0021	.0005	E=2,812,000 pounds per square inch.
174,384	1,200	.0029	.0006	
203,448	1,400	.0035	.0067	
232,512	1,600	.0043	.0010	
261,576	1,800	.0077	.0026	First crack.
289,800	1,994	....	....	Ultimate strength.

Marks, 51.
Composition: Alpha cement, 1; fine sand, 1; stone, 3 (1½″ pebbles, 2; ⅜″ pebbles, 1).
Water used in mortar, 32.31 per cent of cement.
Age, 23 days.
Set in mold 1 day, in water 22 days.
Weight per cubic foot, 151.38 pounds.
Sectional area, 144.24 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	.0001	0.	
43,272	300	.0002	0.	
57,696	460	.0003	0.	
72,120	500	.0005	0.	
86,544	600	.0007	.0001	E=4,167,000 pounds per square inch.
100,968	700	.0009	.0001	
115,392	800	.0011	.0001	
129,816	900	.0013	.0001	
144,240	1,000	.0014	.0001	E=3,461,000 pounds per square inch.
173,088	1,200	.0016	.0001	
201,936	1,400	.0018	.0001	E=3,846,000 pounds per square inch.
230,780	1,600	.0022	.0001	
259,632	1,800	.0024	.0001	
288,480	2,000	.0027	.0001	
317,328	2,200	.0031	0.	
346,176	2,400	.0034	0.	
375,024	2,600	.0041	.0002	
403,872	2,800	,0056	0.	
430,000	....	....	....	First crack.
432,720	3,000	.0097	....	
436,100	3,023	....	....	Ultimate strength.

Composition: Alpha cement, 1; fine sand, 1; stone, 3 (1½″ pebbles, 2; ⅜″ pebbles, 1).
Water used in mortar, 32.31 per cent of cement.
Age, 32 days.
Set in mold 1 day, in water 31 days.
Weight per cubic foot, 150.76 pounds.
Sectional area, 144.84 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,484	100	0.	0.	Initial load.
28,968	200	.0001	0.	
43,452	300	.0003	0.	
57,936	400	.0004	0.	
72,420	500	.0005	0.	
86,904	600	.0007	.0001	$E=4,167,000$ pounds per square inch.
101,388	700	.0009	.0001	
115,872	800	.0010	.0001	
130,356	900	.0011	.0001	
144,840	1,000	.0013	.0002	$E=4,091,000$ pounds per square inch.
173,808	1,200	.0016	.0002	
202,776	1,400	.0020	.0003	$E=3,333,000$ pounds per square inch.
231,744	1,600	.0023	.0005	
260,712	1,800	.0027	.0005	
289,680	2,000	.0031	.0005	
318,648	2,200	.0035	.0005	
347,616	2,400	.0038	.0006	
376,584	2,600	.0042	.0006	
405,552	2,800	.0046	.0007	
434,520	3,000	.0052	.0009	
463,488	3,200	.0058	.0009	
492,456	3,400	.0066	.0010	First crack.
521,424	3,600	.0079	.0012	
550,292	3,800	.0110	.0021	Ultimate strength.

Marks, 53.
Composition: Alpha cement, 1; fine sand, 1; pebbles, 3 (1½″ pebbles, 2; ⅜″ pebbles, 1).
Water used in mortar, 32.31 per cent of cement.
Age, 61 days.
Set in mold 1 day, in water 60 days.
Weight per cubic foot, 150.87 pounds.
Sectional area, 144.96 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,496	100	0.	0.	Initial load.
28,992	200	.0001	0.	
43,488	300	.0002	0.	
57,984	400	.0004	.0001	
72,480	500	.0005	.0001	
86,976	600	.0006	.0001	E = 5,000,000 pounds per square inch.
101,472	700	.0008	.0001	
115,968	800	.0010	.0002	
130,464	900	.0012	.0003	
144,960	1,000	.0013	.0003	E = 4,500,000 pounds per square inch.
173,952	1,200	.0018	.0005	
202,944	1,400	.0023	.0006	E = 2,631,000 pounds per square inch.
231,936	1,600	.0029	.0008	
260,928	1,800	.0033	.0009	
289,920	2,000	.0040	.0011	
318,912	2,200	.0048	.0013	
347,904	2,400	.0052	.0015	
376,896	2,600	.0059	.0017	
405,888	2,800	.0065	.0019	
434,880	3,000	.0074	.0021	
463,872	3,200	.0071	.0020	
492,864	3,400	.0064	.0015	First crack.
505,900	3,490	....	....	Ultimate strength.

Marks, 54.
Composition: Alpha cement, 1; fine sand, 1; stone, 3 (1½″ pebbles, 1; ⅜″ pebbles, 1; ¼″ gravel, 1).
Water used in mortar, 33.67 per cent of cement.
Age, 7 days.
Set in mold 1 day, in water 6 days.
Weight per cubic foot, 145.27 pounds.
Sectional area, 144 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,400	100	0.	0.	Initial load.
28,800	200	.0002	0.	
43,200	300	.0006	0.	
57,600	400	.0010	.0002	
72,000	500	.0013	.0003	
86,400	600	.0018	.0005	E = 1,923,000 pounds per square inch.
100,800	700	.0023	.0008	
115,200	800	.0029	.0011	
129,600	900	.0035	.0014	
144,000	1,000	.0044	.0019	E = 1,800,000 pounds per square inch.
172,800	1,200	.0079	.0041	
201,600	1,400	.0140	.0086	
214,100	1,486	....	....	First crack and ultimate strength.

Marks, 55.
Composition: Alpha cement, 1; fine sand, 1; stone, 3 (1½" pebbles, 1; ⅜" pebbles, 1; ¼ inch gravel, 1).
Water used in mortar, 33.67 per cent of cement.
Age, 22 days.
Set in mold 1 day, in water 21 days.
Weight per cubic foot, 149.74 pounds.
Sectional area, 143.52 square inches.
Gauged length, 5".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,352	100	0.	0.	Initial load.
28,704	200	.0001	0.	
43,056	300	.0002	0.	
57,408	400	.0003	0.	
71,760	500	.0005	.0001	
86,112	600	.0007	.0001	E = 4,167,000 pounds per square inch.
100,464	700	.0008	.0001	
114,816	800	.0010	.0001	
129,168	900	.0012	.0001	
143,520	1,000	.0015	.0001	E = 3,214,000 pounds per square inch.
172,224	1,200	.0019	.0002	
200,928	1,400	.0024	.0003	E = 2,174,000 pounds per square inch.
229,632	1,600	.0031	.0005	
258,336	1,800	.0037	.0006	
287,040	2,000	.0044	.0007	
315,744	2,200	.0052	.0009	
344,448	2,400	.0065	.0013	
373,152	2,600	.0105	.0036	
384,000	2,676	....	....	Ultimate strength.

Marks, 56.
Composition: Alpha cement, 1; fine sand, 1; stone, 3 (1½″ pebbles, 1; ⅜″ pebbles, 1; ¼″ gravel, 1).
Water used in mortar, 33.67 per cent of cement.
Age, 32 days.
Set in mold 1 day, in water 31 days.
Weight per cubic foot, 148.26 pounds.
Sectional area, 144.72 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,472	100	0.	0.	Initial load.
28,944	200	.0001	0.	
43,416	300	.0004	0.	
57,888	400	.0005	.0001	
72,360	500	.0006	0.	
86,832	600	.0008	0.	E = 3,125,000 pounds per square inch.
101,304	700	.0010	0.	
115,776	800	.0012	.0001	
130,248	900	.0013	.0001	
144,720	1,000	.0015	.0002	E = 3,461,000 pounds per square inch.
173,664	1,200	.0020	.0003	
202,608	1,400	.0025	.0004	E = 2,500,000 pounds per square inch.
231,552	1,600	.0030	.0005	
260,496	1,800	.0035	.0006	
289,440	2,000	.0041	.0008	
318,384	2,200	.0048	.0009	
347,328	2,400	.0057	.0011	
376,272	2,600	.0073	.0017	
405,216	2,800	.0093	.0025	First crack.
434,160	3,000	.0117	.0041	Ultimate strength.

Composition: Alpha cement, 1; fine sand, 1; stone, 3 (1½″ pebbles, 1; ⅜″ pebbles, 1; ¼″ gravel, 1).
Water used in mortar, 33.67 per cent of cement.
Age, 65 days.
Set in mold 1 day, in water 64 days.
Weight per cubic foot, 147.89 pounds.
Sectional area, 144.84 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,484	100	0.	0.	Initial load.
28,968	200	.0001	0.	
43,452	300	.0002	0.	
57,936	400	.0004	0.	
72,420	500	.0006	0.	
86,904	600	.0008	0.	E = 3,125,000 pounds per square inch.
101,388	700	.0010	.0001	
115,872	800	.0012	.0001	
130,356	900	.0013	.0001	
144,840	1,000	.0016	.0002	E = 3,214,000 pounds per square inch.
173,808	1,200	.0020	.0002	
202,776	1,400	.0024	.0003	E = 2,941,000 pounds per square inch
231,744	1,600	.0030	.0006	
260,712	1,800	.0034	.0007	
289,680	2,000	.0039	.0008	
318,648	2,200	.0044	.0010	
347,616	2,400	.0050	.0012	
376,584	2,600	.0058	.0013	
405,552	2,800	.0063	.0015	
434,520	3,000	.0072	.0018	
463,488	3,200	.0082	.0021	
492,456	3,400	.0095	.0027	
521,424	3,600	.0111	.0033	
550,392	3,800	.0130	....	Ultimate strength.

Marks, 58.
Composition: Alpha cement, 1; fine sand, 1; broken stone, 3 (2½" ring stone).
Water used in mortar, 28.78 per cent of cement.
Age, 7 days.
Set in mold 1 day, in water 6 days.
Weight per cubic foot, 158.37 pounds.
Sectional area, 144.36 square inches.
Gauged length, 5".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,436	100	0.	0.	Initial load.
28,872	200	.0002	0.	
43,308	300	.0004	.0001	
57,744	400	.0006	.0001	
72,180	500	.0008	.0002	
86,616	600	.0011	.0003	E=3,125,000 pounds per square inch.
101,052	700	.0013	.0003	
115,488	800	.0015	.0004	
129,924	900	.0018	.0006	
144,360	1,000	.0021	.0007	E=3,214,000 pounds per square inch.
173,232	1,200	.0027	.0010	
202,104	1,400	.0039	.0016	
230,976	1,600	.0053	.0024	
259,848	1,800	.0075	.0037	
288,720	2,000	.0099	.0054	First crack.
317,592	2,200	.0124	.0072	
346,464	2,400	.0137	.0076	Ultimate strength.

Marks, 59.
Composition: Alpha cement, 1; fine sand, 1; broken stone, 3 (2½″ ring stone).
Water used in mortar, 28.78 per cent of cement.
Age, 22 days.
Set in mold 1 day, in water 21 days.
Weight per cubic foot, 159.27 pounds.
Sectional area, 145.56 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,556	100	0.	0.	Initial load.
29,112	200	0.	0.	
43,668	300	.0001	0.	
58,224	400	.0002	0.	
72,780	500	.0003	0.	
87,336	600	.0004	.0001	E = 8,333,000 pounds per square inch.
101,892	700	.0006	.0001	
116,448	800	.0007	.0001	
131,004	900	.0008	.0001	
145,560	1,000	.0010	.0002	E = 5,625,000 pounds per square inch.
174,672	1,200	.0012	.0002	
203,784	1,400	.0014	.0002	E = 7.143,000 pounds per square inch.
232,896	1,600	.0017	.0002	
262,008	1,800	.0018	.0003	
291,120	2,000	.0018	.0003	
320,232	2,200	.0019	.0002	
349,344	2,400	.0020	.0002	
378,456	2,600	.0021	.0001	
407,568	2,800	.0022	.0001	
436,680	3,000	.0023	.0001	
465,792	3,200	.0025	0.	First crack.
494,904	3,400	.0028	0.	
524,016	3,600	.0031	0.	
553,128	3,800	.0038	0.	
582,240	4,000	.0051	.0002	
603,000	4,143	....	....	Ultimate strength.

Marks, 60.

Composition: Alpha cement, 1; fine sand, 1; broken stone, 3 (2½" ring stone).

Water used in mortar, 28.78 per cent of cement.

Age, 32 days.

Set in mold 1 day, in water 31 days.

Weight per cubic foot, 161.44 pounds.

Sectional area, 144.48 square inches.

Gauged length, 5".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,448	100	0.	0.	Initial load.
28,896	200	.0001	0.	
43,344	300	.0002	0.	
57,792	400	.0003	0.	
72,240	500	.0004	0.	
86,688	600	.0005	0.	E = 5,000,000 pounds per square inch.
101,136	700	.0007	.0001	
115,584	800	.0008	.0001	
130,032	900	.0009	.0001	
144,480	1,000	.0011	.0001	E = 4,500,000 pounds per square inch.
173,376	1,200	.0014	.0002	
202,272	1,400	.0018	.0003	E = 3,333,000 pounds per square inch.
231,168	1,600	.0023	.0004	
260,064	1,800	.0026	.0007	
288,960	2,000	.0033	.0008	
290,000	....	....	....	Corner cracked.
317,856	2,200	.0037	.0010	
346,752	2,400	.0043	.0013	
375,648	2,600	.0049	.0016	
404,544	2,800	.0059	.0019	
433,440	3,000	.0073	.0027	
462,336	3,200	.0093	.0040	
491,232	3,400	.0112	.0052	
520,128	3,600	.0135	.0068	
549,024	3,800	.0158	.0085	
577,920	4,000	.0187	.0105	
598,200	4,140	....	....	Ultimate strength.

Marks, 61.
Composition: Alpha cement, 1; fine sand, 1; broken stone, 3 ($2\frac{1}{2}''$ ring stone).
Water used in mortar, 28.78 per cent of cement.
Age, 65 days.
Set in mold 1 day, in water 64 days.
Weight per cubic foot, 161.76 pounds.
Sectional area, 144.96 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,496	100	0.	0.	Initial load.
28,992	200	0.	0.	
43,488	300	0.	0.	
57,984	400	.0001	0.	
72,480	500	.0001	0.	
86,976	600	.0002	0.	E = 12,500,000 pounds per square inch.
101,472	700	.0002	0.	
115,968	800	.0003	0.	
130,464	900	.0005	0.	
144,960	1,000	.0006	0.	E = 7,500,000 pounds per square inch.
173,952	1,200	.0009	0.	
202,944	1.400	.0011	0.	E = 3,846,000 pounds per square inch.
231,936	1.600	.0014	0.	
260,928	1,800	.0016	0.	
289,920	2,000	.0020	.0001	
318,912	2,200	.0023	.0002	
347,904	2,400	.0029	.0003	
376,896	2,600	.0036	.0006	
405,888	2,800	.0042	.0008	
434,880	3,000	.0050	.0012	
463,872	3,200	.0060	.0016	
492,864	3,400	.0071	.0021	
521,856	3,600	.0089	.0031	
550,848	3,800	.0115	.0048	First crack.
579,840	4,000	.0141	.0066	
608,832	4,200	.0179	.0092	
637,824	4,400	.0245	.0142	
655,700	4,523	....	....	Ultimate strength.

Marks, 62.
Composition: Alpha cement, 1; fine sand, 1; stone, 3 (2½" ring stone, 1; ⅜" pebbles, 1; ¼" gravel, 1).
Water used in mortar, 33.68 per cent of cement.
Age, 7 days.
Set in mold 1 day, in water 6 days.
Weight per cubic foot, 148.63 pounds.
Sectional area, 144.84 square inches.
Gauged length, 5".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14.484	100	0.	0.	Initial load.
28,968	200	.0001	0.	
43,452	300	.0004	.0001	
57,986	400	.0006	.0001	
72,420	500	.0009	.0002	
86,904	600	.0011	.0002	E=2,778,000 pounds per square inch.
101,388	700	.0014	.0002	
115,872	800	.0017	.0002	
130,356	900	.0021	.0003	
144,840	1,000	.0027	.0005	E=2,045,000 pounds per square inch.
173,808	1,200	.0045	.0014	
202,776	1,400	.0105	.0055	
220,109	1,520	....	....	Ultimate strength.

Marks, 63.
Composition: Alpha cement, 1; fine sand, 1; stone, 3 (2½" ring stone, 1; ⅜" pebbles, 1; ¼" gravel, 1).
Water used in mortar, 33.68 per cent of cement.
Age, 22 days.
Set in mold 1 day, in water 21 days.
Weight per cubic foot, 152.48 pounds.
Sectional area, 144.96 square inches.
Gauged length, 5".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,496	100	0.	0.	Initial load.
28,992	200	.0001	0.	
43,488	300	.0002	.0001	
57,984	400	.0004	.0001	
72,480	500	.0005	.0001	
86,976	600	.0006	.0001	E=5,000,000 pounds per square inch.
101,472	700	.0008	.0002	
115,968	800	.0009	.0002	
130,464	900	.0011	.0002	
144,960	1,000	.0012	.0002	E=4,500,000 pounds per square inch.
173,952	1,200	.0016	.0003	
202,944	1,400	.0019	.0003	E=2,631,000 pounds per square inch
231,936	1,600	.0024	.0003	
260,928	1,800	.0028	.0005	
289,920	2,000	.0035	.0006	
318,912	2.200	.0043	.0009	
347,904	2,400	.0056	.0014	
376,896	2,600	.0077	.0024	
405,888	2,800	.0113	.0045	Ultimate strength.

Marks, 64.
Composition: Alpha cement, 1; fine sand, 1; broken stone, 3 (2½" ring stone, 1; ⅜" pebbles, 1; ¼" gravel, 1).
Water used in mortar, 33.68 per cent of cement.
Age, 32 days.
Set in mold 1 day, in water 31 days.
Weight per cubic foot, 151 pounds.
Sectional area, 144.24 square inches.
Gauged length, 5".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	.0001	0.	
43.272	300	.0003	.0001	
57,696	400	.0004	.0001	
72,120	500	.0006	.0001	
86,544	600	.0007	.0001	E=4,167,000 pounds per square inch.
100,968	700	.0009	.0001	
115,392	800	.0010	.0001	
129,816	900	.0012	.0001	
144,240	1,000	.0013	.0001	E=3,750,000 pounds per square inch.
173,088	1,200	.0017	.0001	
201,936	1.400	.0020	.0001	E=2,941,000 pounds per square inch.
230,784	1,600	.0025	.0002	
259,632	1,800	.0028	.0002	
288,480	2,000	.0030	.0001	
317,328	2,200	.0035	0.	
346,176	2,400	.0044	0.	
375.024	2,600	.0074	—.0001	
389,500	2,700	....	....	Ultimate strength.

Marks, 65.
Composition: Alpha cement, 1; fine sand, 3; broken stone, 6 (1" ring stone).
Water used in mortar, 64.64 per cent of cement.
Age, 8 days.
Set in air.
Weight per cubic foot, 152.27 pounds.
Sectional area, 144.48 square inches.
Gauged length, 5".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,448	100	0.	0.	Initial load.
28,896	200	.0014	.0010	
43,344	300	.0041	.0034	
57,792	400	.0077	.0063	
72.240	500	.0112	.0094	
86,688	600	.0163	.0137	E=961,000 pounds per square inch.
101,136	700	.0219	.0187	First crack.
115,584	800	.0277	.0237	
121,500	841	....	....	Ultimate strength.

Marks, 66.
Composition: Alpha cement, 1; fine sand, 3; broken stone, 6 (1″ ring stone).
Water used in mortar, 64.64 per cent of cement.
Age, 8 days.
Set in air.
Weight per cubic foot, 151.64 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	.0009	.0006	
43,236	300	.0035	.0027	
57,648	400	.0066	.0055	
72,060	500	.0114	.0097	
86,472	600	.0169	.0142	First crack.
100,884	700	.0224	.0193	
115,296	800	.0300	.0264	
125,900	874	....	....	Ultimate strength.

Marks, 67.
Composition: Alpha cement, 1; fine sand, 3; broken stone, 6 (1″ ring stone).
Water used in mortar, 64.64 per cent of cement.
Age, 17 days.
Set in air.
Weight per cubic foot, 152.01 pounds.
Sectional area, 144.24 square inches.
Guaged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square foot.	Compression.	Set	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	.0001	0.	
43,272	300	.0003	0.	
57,696	400	.0007	.0001	
72,120	500	.0011	.0002	
86,544	600	.0020	.0008	E=2,083,000 pounds per square inch.
100,968	700	.0033	.0015	
115,392	800	.0046	.0026	
129,816	900	.0068	.0043	
144,240	1,000	.0092	.0061	E=1,452,000 pounds per square inch.
158,664	1,100	.0123	.0087	
173,088	1,200	.0157	.0114	First crack.
187,512	1,300	.0213	.0162	
197,300	1,368	.0250	....	Ultimate strength.

Composition. Alpha cement, 1; fine sand, 3; broken stone, 6 (1″ ring stone).
Water used in mortar, 64.64 per cent of cement.
Age, 21 days.
Set in air.
Weight per cubic foot, 151.64 pounds.
Sectional area 145.08 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,508	100	0.	0.	Initial load.
29,016	200	.0002	0.	
43,524	300	.0007	.0002	
58.032	400	.0014	.0007	
72,540	500	.0023	.0012	
87,048	600	.0035	.0019	E = 1,502,000 pounds per square inch.
101,556	700	.0046	.0027	
116,064	800	.0059	.0036	
130,572	900	.0073	.0047	
145,080	1,000	.0087	.0057	E = 1,500,000 pounds per square inch.
159,588	1,100	.0105	.0071	
174,096	1,200	.0128	.0089	
188,604	1,300	.0153	.0111	
203,112	1,400	.0170	.0120	First crack.
210,600	1,452	....	....	Ultimate strength.

Marks, 69.
Composition: Alpha cement, 1; fine sand, 3; broken stone, 6 (1″ ring stone).
Water used in mortar, 64.64 per cent of cement.
Age, 20 days.
Set in air.
Weight per cubic foot, 151.63 pounds.
Sectional area, 143.88 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,388	100	0.	0.	Initial load.
28,776	200	.0002	0.	
43,164	300	.0003	.0001	
57,552	400	.0006	.0001	
71,940	500	.0010	.0002	
86,328	600	.0016	.0004	E = 2,083,000 pounds per square inch.
100.716	700	.0024	.0009	
115.104	800	.0033	.0015	
129,492	900	.0043	.0022	
143,880	1,000	.0054	.0029	E = 1,800,000 pounds per square inch.
158.268	1,100	.0066	.0039	
172,656	1,200	.0082	.0047	
187,044	1,300	.0099	.0061	
201,432	1,400	.0120	.0078	
215,820	1,500	.0148	.0099	
230,208	1,600	.0178	.0123	
244,597	1,700	.0260	....	Ultimate strength.

Marks, 70.
Composition: Alpha cement, 1; fine sand, 3; broken stone, 6 (1″ ring stone.)
Water used in mortar, 64.64 per cent of cement.
Age, 42 days.
Set in air.
Weight per cubic foot, 153.91 pounds.
Sectional area, 143.88 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,388	100	0.	0.	Initial load.
28,776	200	.0001	0.	
43,164	300	.0002	0.	
57,552	400	.0005	0.	
71,940	500	.0007	.0001	
86,328	600	.0010	.0002	E = 3,125,000 pounds per square inch.
100,716	700	.0015	.0005	
115,104	800	.0018	.0006	
129,492	900	.0022	.0008	
143,880	1,000	.0027	.0010	E = 2,647,000 pounds per square inch.
172,656	1,200	.0036	.0014	
201,432	1,400	.0051	.0022	E = 1,389,000 pounds per square inch.
230,208	1,600	.0066	.0033	
258,984	1,800	.0087	.0044	
287,760	2,000	.0113	.0060	First crack.
316,536	2,200	.0141	.0079	
328,500	2,283	....	....	Ultimate strength.

Marks, 71.
Composition: Alpha cement, 1; fine sand, 3; broken stone, 6 (1″ ring stone).
Water used in mortar, 64.64 per cent of cement.
Age, 42 days.
Set in air.
Weight per cubic foot, 150.12 pounds.
Sectional area, 144.84 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,484	100	0.	0.	Initial load.
28,968	200	.0001	0.	
43,452	300	.0002	0.	
57,936	400	.0006	.0001	
72,420	500	.0008	.0001	
86,904	600	.0010	.0002	E = 3,125,000 pounds per inch.
101,388	700	.0014	.0002	
115,872	800	.0018	.0004	
130,356	900	.0023	.0006	
144,840	1,000	.0027	.0009	E = 2,500,000 pounds per inch.
173,808	1,200	.0040	.0014	
202,776	1,400	.0057	.0024	
231,744	1,600	.0075	.0035	E = 1,064,000 pounds per inch.
260,712	1,800	.0107	.0053	
289,680	2,000	.0141	.0076	First crack.
304,300	2,101	....	....	Ultimate strength.

Marks, 72.

Composition: "Egypt" Portland cement, 1; fine sand, 1; broken stone, 3 (1″ ring stone).

Water used in mortar, 40 per cent of cement.

Age, 8 days.

Set in mold 1 day, in water 7 days.

Weight per cubic foot, 153.51 pounds.

Sectional area, 144.72 square inches.

Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,472	100	0.	0.	Initial load.
28,944	200	.0001	0.	
43,416	300	.0004	0.	
57,888	400	.0006	0.	
72,360	500	.0008	.0002	
86,832	600	.0010	.0003	E = 3,571,000 pounds per square inch.
101,304	700	.0013	.0003	
115,776	800	.0017	.0005	
130,248	900	.0020	.0006	
144,720	1,000	.0025	.0008	E = 2,647,000 pounds per square inch.
173,664	1,200	.0036	.0011	
202,608	1,400	.0055	.0021	
231,552	1,600	.0099	.0054	
256,100	1,770	....	....	Ultimate strength.

Marks, 73.

Composition: "Egypt" Portland cement, 1; fine sand, 1; broken stone 3 (1″ ring stone).

Water used in mortar, 40 per cent of cement.

Age, 21 days.

Set in mold 1 day, in water 20 days.

Weight per cubic foot, 157.60 pounds.

Sectional area, 144.96 square inches.

Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,496	100	0.	0.	Initial load.
28,992	200	.0002	0.	
43,488	300	.0003	.0001	
57,984	400	.0005	.0001	
72,480	500	.0007	.0002	
86,976	600	.0010	.0003	E = 3,571,000 pounds per square inch.
101,472	700	.0012	.0004	
115,968	800	.0016	.0005	
130,464	900	.0019	.0006	
144,960	1,000	.0025	.0008	E = 2,647,000 pounds per square inch.
173,952	1,200	.0037	.0014	
202,944	1,400	.0054	.0023	E = 1,064,000 pounds per square inch.
231,936	1,600	.0080	.0040	
260,928	1,800	.0112	.0059	
289,920	2,000	.0154	.0090	
318,912	2,200	.0226	.0144	First crack.
374,200	2,581	....	....	Ultimate strength.

Marks, 74.
Composition: "Egypt" Portland cement, 1; fine sand, 1; broken stone 3 (1″ ring stone).
Water used in mortar, 40 per cent of cement.
Age, 42 days.
Set in mold 1 day, in water 41 days.
Weight per cubic foot, 153.07 pounds.
Sectional area, 145.20 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,520	100	0.	0.	Initial load.
29,040	200	.0001	0.	
43,560	300	.0003	0.	
58,080	400	.0006	0.	
72,600	500	.0010	.0002	
87,120	600	.0013	.0005	E=3,125,000 pounds per square inch.
101,640	700	.0019	.0007	
116,160	800	.0025	.0012	
130,680	900	.0034	.0016	
145,200	1,000	.0044	.0022	E=2,045,000 pounds per square inch.
174,240	1,200	.0067	.0037	
203,280	1,400	.0099	.0058	
232,320	1,600	.0144	.0091	
201,360	1,800	.0201	.0131	Cracked at corner.
290,400	2,000	....	....	Ultimate strength.

Marks, 75.
Composition: "Egypt" Portland cement, 1; fine sand, 1; broken stone 3 (1″ ring stone).
Water used in mortar, 40 per cent of cement.
Age, 61 days.
Set in mold 1 day, in water 60 days.
Weight per cubic foot, 154.73 pounds.
Sectional area, 144.96 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,496	100	0.	0.	Initial load.
28,992	200	.0001	0.	
43,488	300	.0002	0.	
57,984	400	.0003	0.	
72,480	500	.0004	.0001	
86,976	600	.0006	.0001	E=5,000,000 pounds per square inch.
101,472	700	.0007	.0001	
115,968	800	.0008	.0001	
130,464	900	.0010	.0001	
144,960	1,000	.0012	.0001	E=4,091,000 pounds per square inch.
173,952	1,200	.0015	.0002	
202,944	1,400	.0019	.0003	E=3,383,000 pounds per square inch.
231,936	1,600	.0024	.0006	
260,928	1,800	.0030	.0008	
289,920	2,000	.0036	.0010	
318,912	2,200	.0043	.0012	
347,904	2,400	.0049	.0013	
365,000	....	....	....	First crack.
376,896	2,600	.0058	.0007	Ultimate strength.

Marks, 82.
Composition: Alpha cement, 1; fine sand, 1; stone, 3 (3″ pebbles
Water used in mortar, 29.80 per cent of cement.
Age, 11 days.
Set in mold 1 day, in water 10 days.
Weight per cubic foot, 151.36 pounds.
Sectional area, 144.72 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,472	100	0.	0.	Initial load.
28,944	200	.0001	0.	
43,416	300	.0003	.0001	
57,888	400	.0004	.0001	
72,360	500	.0006	.0001	
86,832	600	.0009	.0001	E = 3,125,000 pounds per square inch.
101,304	700	.0011	.0002	
115,776	800	.0013	.0002	
130,248	900	.0015	.0003	
144;720	1,000	.0017	.0004	E = 3,461,000 pounds per square inch.
173,664	1,200	.0023	.0005	
202,608	1,400	.0029	.0009	E = 2,273,000 pounds per square inch.
231,552	1,600	.0037	.0012	
260,496	1,800	.0046	.0016	
289,440	2,000	.0058	.0023	
318,384	2,200	.0071	.0029	
347,328	2,400	.0090	.0041	
376,272	2,600	.0117	.0057	
380,000				First crack.
405,216	2,800	.0159	.0089	Ultimate strength.

Marks, 83.
Composition: Alpha cement, 1; fine sand, 1; stone 3 (3″ pebbles).
Water used in mortar, 29.80 per cent of cement.
Age, 26 days.
Set in mold 1 day, in water 25 days.
Weight per cubic foot, 150.63 pounds.
Sectional area, 144.48 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,448	100	0.	0.	Initial load.
28,896	200	.0001	0.	
43,344	300	.0002	0.	
57,792	400	.0003	0.	
72,240	500	.0004	0.	
86,688	600	.0005	0.	E=5,000,000 pounds per square inch.
101,136	700	.0007	0.	
115,584	800	.0008	0.	
130,032	900	.0010	0.	
144,480	1,000	.0011	0.	E=4,091,000 pounds per square inch.
173,376	1,200	.0014	.0001	
202,272	1,400	.0018	.0001	E=3,125,000 pounds per square inch.
231,168	1,600	.0020	.0001	
260,064	1,800	.0024	.0001	
288,960	2,000	.0028	.0001	
317,856	2,200	.0032	.0001	
346,752	2,400	.0038	.0003	
375,648	2,600	.0042	.0004	
404,544	2,800	.0049	.0006	Corner cracked.
433,440	3,000	.0057	.0009	
462,336	3,200	.0069	.0013	
491,232	3,400	.0084	.0023	Ultimate strength.

Marks, 84.
Composition: Alpha cement, 1; fine sand, 1; stone, 3 (3″ pebbles).
Water used in mortar, 29.80 per cent of cement.
Age, 41 days.
Set in mold 1 day, in water 40 days.
Weight per cubic foot, 153.60 pounds.
Sectional area, 144.24 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	.0001	0.	
43,272	300	.0003	0.	
57,696	400	.0006	.0001	
72,120	500	.0007	.0001	
86,544	600	0009	.0001	E = 3,125,000 pounds per square inch.
100,968	700	.0011	.0002	
115,392	800	.0012	.0002	
129,816	900	.0013	.0003	
144,240	1,000	.0015	.0003	E = 3,750,000 pounds per square inch.
173,088	1,200	.0018	.0003	
201,936	1,400	.0022	.0004	E = 3,571,000 pounds per square inch.
230,784	1,600	.0026	.0006	
259,632	1,800	.0031	.0007	
288,480	2,000	.0036	.0010	
317,328	2,200	.0040	.0011	
346,176	2,400	.0046	.0013	
375,024	2,600	.0053	.0016	
403,872	2,800	.0061	.0020	
432,720	3,000	.0070	.0024	
461,568	3,200	.0081	.0031	
490,416	3,400	.0096	.0041	
519,264	3,600	.0117	.0051	
548,112	3,800	.0138	.0067	First crack.
576,960	4,000	.0162	.0083	
605,808	4,200	.0200	.0109	Ultimate strength.

Water used in mortar, 29.80 per cent of cement.
Age, 46 days.
Set in mold 1 day, in water 45 days.
Weight per cubic foot, 153.21 pounds.
Sectional area, 144.72 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,472	100	0.	0.	Initial load.
28.944	200	0.	0.	
43,416	300	.0001	0.	
57,888	400	.0002	0.	
72,360	500	.0004	0.	
86,832	600	.0005	0.	E=5,000,000 pounds per square inch.
101,304	700	.0006	0.	
115,776	800	.0008	.0001	
130,248	900	.0010	.0001	
144,720	1,000	.0011	.0001	E=4,500,000 pounds per square inch.
173.664	1,200	.0015	.0002	
202,608	1,400	.0020	.0004	E=3,333,000 pounds per square inch.
231,552	1,600	.0025	.0007	
260,496	1,800	.0030	.0008	
289,440	2,000	.0035	.0010	
318,384	2,200	.0041	.0011	
347,328	2,400	.0045	.0012	
376,272	2,600	.0053	.0015	
405,216	2,800	.0064	.0020	
434,160	3,000	.0081	.0026	
463,104	3,200	.0112	.0044	
480,000	....	....	....	First crack.
492,048	3,400	.0215	.0110	Ultimate strength.

Marks, 86.
Composition: Alpha cement, 1; fine sand, 1; broken stone, 3 (1½″ ring stone).
Water used in mortar, 30.39 per cent of cement.
Age, 11 days.
Set in mold 1 day, in water 10 days.
Weight per cubic foot, 157.80 pounds.
Sectional area, 144.72 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,472	100	0.	0.	Initial load.
28,944	200	.0001	0.	
43,416	300	.0002	0.	
57,888	400	.0003	0.	
72,360	500	.0004	.0001	
86,832	600	.0006	.0001	E=5,000,000 pounds per square inch.
101,304	700	.0008	.0001	
115,776	800	.0009	.0001	
130,248	900	.0010	.0002	
144,720	1,000	.0012	.0002	E=4,500,000 pounds per square inch.
173,664	1,200	.0014	.0002	
202,608	1,400	.0019	.0003	E=3,125,000 pounds per square inch.
231,552	1,600	.0026	.0007	
260,496	1,800	.0032	.0010	
289,440	2,000	.0040	.0014	
318,384	2,200	.0051	.0018	
347,328	2,400	.0065	.0026	
376,272	2,600	.0086	.0037	
405,216	2,800	.0112	.0053	
434,160	3,000	.0149	.0077	First crack.
461,500	3,189	....	....	Ultimate strength.

Marks, 87.

Composition: Alpha cement, 1; fine sand, 1; broken stone, 3 (1½" ring stone).

Water used in mortar, 30.39 per cent of cement.

Age, 26 days.

Set in mold 1 day, in water 25 days.

Weight per cubic foot, 160.56 pounds.

Sectional area, 144.60 square inches.

Gauged length, 5".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	.0001	0.	
43,380	300	.0002	0.	
57,840	400	.0004	0.	
72,300	500	.0005	0.	
86,760	600	.0006	0.	E=4,167,000 pounds per square inch.
101,220	700	.0007	.0001	
115,680	800	.0009	.0001	
130,140	900	.0010	.0002	
144,600	1,000	.0011	.0003	E=5,625,000 pounds per square inch.
173,520	1,200	.0014	.0003	
202,440	1,400	.0018	.0004	E=3,125,000 pounds per square inch.
231,360	1,600	.0023	.0005	
260,280	1,800	.0029	.0008	
289,200	2,000	.0035	.0011	
318,120	2,200	.0045	.0015	
347,040	2,400	.0056	.0021	
375,960	2,600	.0070	.0029	
404,880	2,800	.0083	.0035	
433,800	3,000	.0098	.0044	
462,720	3,200	.0114	.0054	
491,640	3,400	.0136	.0067	
520,560	3,600	.0160	.0082	
530,000	....	....	....	First crack.
549,480	3,800	.0188	.0102	
578,400	4,000	.0250	.0150	
579,200	4,006	....	....	Ultimate strength.

Marks, 88.
Composition: Alpha cement, 1; fine sand, 1; broken stone, 3 (1½″ ring stone).
Water used in mortar, 29.80 per cent of cement.
Age, 41 days.
Set in mold 1 day, in water 40 days.
Weight per cubic foot, 161.14 pounds.
Sectional area, 144.24 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,424	100	0.	0.	Initial load.
28,848	200	.0001	0.	
43,272	300	.0002	0.	
57,696	400	.0003	0.	
73,120	500	.0003	— .0001	
86,544	600	.0004	0.	E = 6,250,000 pounds per square inch.
100,968	700	.0005	0.	
115,392	800	.0007	0.	
129,816	900	.0008	0.	
144,240	1,000	.0009	0.	E = 5,000,000 pounds per square inch.
173,088	1,200	.0011	0.	
201,936	1,400	.0014	0.	E = 5,000,000 pounds per square inch.
230,784	1,600	.0016	.0001	
259.632	1,800	.0018	.0001	
288,480	2,000	.0020	.0001	
317,328	2,200	.0022	.0001	
346,176	2,400	.0024	.0001	
375,024	2,600	.0027	.0001	
403,872	2,800	.0029	.0001	
432,720	3,000	.0033	.0001	
461,568	3,200	.0036	.0001	
490,416	3,400	.0040	.0002	
519,264	3,600	.0043	.0002	
548,112	3,800	.0047	.0002	
576,960	4,000	.0052	.0001	
605.808	4,200	.0059	.0001	First crack.
634,656	4,400	.0066	.0001	
658,000	4,562	....	....	Ultimate strength.

Composition: Alpha cement, 1; lake sand, 2; broken stone, 5 (1½-ring stone).
Water used in mortar, 30.39 per cent of cement.
Age, 48 days.
Set in mold 1 day, in water 47 days.
Weight per cubic foot, 157.39 pounds.
Sectional area, 144 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,400	100	0.	0.	Initial load.
28,800	200	0.	0.	
43,200	300	.0001	0.	
57,600	400	.0004	0.	
72,000	500	.0005	0.	
86,400	600	.0006	0.	E = 4,167,000 pounds per square inch.
100,800	700	.0008	.0001	
115,200	800	.0010	.0001	
129,600	900	.0011	.0001	
141,000	1,000	.0013	.0002	E = 4,091,000 pounds per square inch.
172,800	1,200	.0017	.0004	
201,600	1,400	.0022	.0006	E = 2,778,000 pounds per square inch.
230,400	1,600	.0029	.0009	
259,200	1,800	.0035	.0010	
288,000	2,000	.0043	.0014	
316,800	2,200	.0058	.0031	
345,600	2,400	.0082	.0035	
372,000	2,583	....	....	Ultimate strength.

Marks, 90.
Composition: Alpha cement, 1; sand, 0; broken stone, 1½ (¾" ring stone).
Water used with cement, 20.84 per cent of cement.
Age, 11 days.
Set in mold 3 days, in water 8 days.
Weight, per cubic foot, 151.89 pounds.
Sectional area, 144.72 square inches.
Gauged length, 5".

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,472	100	0.	0.	Initial load.
28,944	200	.0002	0.	
43,416	300	.0003	0.	
57,888	400	.0004	0.	
72,360	500	.0005	0.	
86,832	600	.0006	0.	E = 4,167,000 pounds per square inch.
101,304	700	.0008	.0001	
115,776	800	.0009	.0001	
130,248	900	.0010	.0001	
144,720	1,000	.0011	.0001	E = 4,500,000 pounds per square inch.
173,664	1,200	.0016	.0002	
202,608	1,400	.0018	.0002	E = 3,125,000 pounds per square inch.
231,552	1,600	.0021	.0002	
260,496	1,800	.0025	.0003	
289,440	2,000	.0030	.0004	
318,384	2,200	.0035	.0006	First crack.
347,328	2,400	.0041	.0008	
376,272	2,600	.0046	.0009	
405,216	2,800	.0051	.0010	
434,160	3,000	.0058	.0014	
463,104	3,200	.0066	.0016	
492,048	3,400	.0074	.0019	
520,992	3,600	.0085	.0023	
549,936	3,800	.0100	.0029	
578,880	4,000	.0121	.0040	
595,800	4,117	....	....	Ultimate strength.

Marks, 91.
Composition: Alpha cement, 1; sand, 0; broken stone, $1\frac{1}{2}$ ($\frac{3}{4}''$ ring stone).
Water used with cement, 20.84 per cent of cement.
Age, 25 days.
Set in mold 3 days, in water 22 days.
Weight per cubic foot, 153.02 pounds.
Sectional area, 144.72 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,472	100	0.	0.	Initial load.
28,944	200	0.	0.	
43,416	300	.0001	0.	
57,888	400	.0002	0.	
72,360	500	.0003	0.	
86,832	600	.0005	0.	E=5,000,000 pounds per square inch.
101,304	700	.0006	0.	
115,776	800	.0007	0.	
130,248	900	.0009	0.	
144,720	1,000	.0011	0.	E=4,091,000 pounds per square inch.
173,664	1,200	.0014	0.	
202,608	1,400	.0017	0.	E=3,571,000 pounds per square inch.
231,552	1,600	.0021	.0001	
260,496	1,800	.0025	.0002	
289,440	2,000	.0027	.0002	
318,384	2,200	.0031	.0002	
347,328	2,400	.0036	.0003	
376,272	2,600	.0040	.0005	
405,216	2,800	.0044	.0005	
434,160	3,000	.0050	.0006	
463,104	3,200	.0057	.0008	First crack.
492,048	3,400	.0064	.0010	
520,992	3,600	.0074	.0013	
549,936	3,800	.0086	.0017	
578,880	4,000	.0105	.0023	
605,000	4,180	....	....	Ultimate strength.

Marks, 92.
Composition: Alpha cement, 1; sand, 0; broken stone, 1½ (¾″ ring stone).
Water used with cement, 20.84 per cent of cement.
Age, 38 days.
Set in mold 3 days, in water 35 days.
Weight per cubic foot, 150.50 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,460	100	0.	0.	Initial load.
28,920	200	0.	....	
43,380	300	0.	....	
57,840	400	.0001	....	
72,300	500	.0002	....	
86,760	600	.0004	0.	E = 6,250,000 pounds per square inch.
101,220	700	.0006	....	
115,680	800	.0007	....	
130,140	900	.0009	....	
144,600	1,000	.0011	0.	E = 4,091,000 pounds per square inch.
173,520	1,200	.0015	.0001	
202,440	1,400	.0019	.0002	E = 3,125,000 pounds per square inch.
231,360	1,600	.0023	.0002	
260,280	1,800	.0025	.0002	
289,200	2,000	.0029	.0002	
318,120	2,200	.0035	.0003	
347,040	2,400	.0040	.0004	
375,960	2,600	.0047	.0007	
404,880	2,800	.0058	.0011	
433,800	3,000	.0102	.0030	First crack.
445,000	3,077	....	....	Ultimate strength.

stone).

Water used with cement, 20.84 per cent of cement.

Age, 43 days.

Set in mold 3 days, in water 40 days.

Weight per cubic foot, 155.57 pounds.

Sectional area, 145.68 square inches.

Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,568	100	0.	0.	Initial load.
29,136	200	0.	0.	
43,704	300	.0001	0.	
58,272	400	.0002	0.	
72,840	500	.0003	0.	
87,408	600	.0004	0.	E=6,250,000 pounds per square inch.
101,976	700	.0006	0.	
116,544	800	.0007	0.	
131,112	900	.0008	0.	
145,680	1,000	.0009	0.	E=5,000,000 pounds per square inch.
174,816	1,200	.0012	.0001	
203,952	1,400	.0015	.0001	E=4,515,000 pounds per square inch.
233,088	1,600	.0018	.0001	
262,224	1,800	.0020	.0001	
291,360	2,000	.0022	.0002	
320,496	2,200	.0025	.0002	
349,632	2,400	.0027	.0002	
378,768	2,600	.0030	.0002	
407,904	2,800	.0033	.0002	
437,040	3,000	.0036	.0002	
466,176	3,200	.0039	.0003	
495,312	3,400	.0042	.0005	
524,448	3,600	.0045	.0006	First crack.
553,584	3,800	.0048	.0007	
582,720	4,000	.0053	.0009	
611,856	4,200	.0059	.0011	
640,992	4,400	.0077	.0017	Ultimate strength.

CONCRETE CEMENT AND MORTAR CUBES MADE AT WATERTOWN ARSENAL, MASS.

Water used, 23.40 per cent of cement.
Age, 21 days.
Set in mold 1 day, in water 20 days.
Weight per cubic foot, 141.64 pounds.
Sectional area, 144.36 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,436	100	0.	0.	Initial load.
28,872	200	.0001	0.	
43,308	300	.0002	0.	
57,744	400	.0003	0.	
72,180	500	.0005	0.	
86,616	600	.0006	0.	E = 4,167,000 pounds per square inch.
101,052	700	.0007	0.	
115,488	800	.0009	0.	
129,924	900	.0010	.0001	
144,360	1,000	.0011	.0001	E = 4,500,000 pounds per square inch.
173,232	1,200	.0013	.0001	
202,104	1,400	.0017	.0001	E = 3,571,000 pounds per square inch.
230,976	1,600	.0020	.0001	
259,848	1,800	.0023	.0002	
288,720	2,000	.0026	.0002	
317,592	2,200	.0031	.0003	
346,464	2,400	.0034	.0004	
375,336	2,600	.0037	.0005	
404,208	2,800	.0042	.0005	
433,080	3,000	.0045	.0006	
461,952	3,200	.0049	.0006	First crack.
490,824	3,400	.0053	.0007	
519,696	3,600	.0058	.0008	
548,568	3,800	.0063	.0009	
577,440	4,000	.0068	.0011	
606,312	4,200	.0073	.0012	
635,184	4,400	.0077	.0017	
664,056	4,600	.0078	.0022	
684,100	4,739	....	....	Ultimate strength.

Marks, 2.
Composition: Alpha cement, 1; sand, 1.
Water used, 23.40 per cent of cement.
Age, 31 days.
Set in mold 1 day, in water 30 days.
Weight per cubic foot, 141.22 pounds.
Sectional area, 144.84 pounds.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 484	100	0.	0.	Initial load.
28, 968	200	.0001	0.	
43, 452	300	.0002	0.	
57, 936	400	.0004	.0001	
72, 420	500	.0005	.0001	
86, 904	600	.0006	.0001	E=5,000,000 pounds per square inch.
101, 388	700	.0008	.0001	
115, 872	800	.0009	.0002	
130, 356	900	.0010	.0002	
144, 840	1, 000	.0011	.0002	E=5,000,000 pounds per square inch.
173, 808	1, 200	.0013	.0002	
202, 776	1, 400	.0016	.0002	E=5,555,000 pounds per square inch.
231, 744	1, 600	.0018	.0001	
260, 712	1, 800	.0018	.0001	
289, 680	2, 000	.0019	.0001	
318, 648	2, 200	.0020	.0001	
347, 616	2, 400	.0021	.0001	
376, 584	2, 600	.0022	.0001	
405, 552	2, 800	.0023	.0001	
434, 520	3, 000	.0024	.0001	
463, 488	3, 200	.0026	.0001	
492, 456	3, 400	.0027	.0001	
521, 424	3, 600	.0028	.0001	
550, 392	3, 800	.0030	.0001	
579, 360	4, 000	.0032	—.0002	
608, 328	4, 200	.0036	—.0002	
637, 296	4, 400	.0044	—.0005	First crack and ultimate strength. Failed on second application of 4,400 pounds per square inch.

Marks, 3.
Composition: Alpha cement, 1; sand, 1.
Water used, 24.03 per cent of cement.
Age, 7 days.
Set in mold 1 day, in water 6 days.
Weight per cubic foot, 139.37 pounds.
Sectional area, 144 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 400	100	0.	0.	Initial load.
28, 800	200	.0001	0.	
43, 200	300	.0002	0.	
57, 600	400	.0004	0.	
72, 000	500	.0006	.0001	
86, 400	600	.0007	.0001	E = 4,167,000 pounds per square inch.
100, 800	700	.0009	.0001	
115, 200	800	.0011	.0001	
129, 600	900	.0013	.0001	
144, 000	1, 000	.0014	.0001	E = 3,461,000 pounds per square inch.
158, 400	1, 100	.0017	.0002	
172, 800	1, 200	.0019	.0003	
187, 200	1, 300	.0022	.0003	
201, 600	1, 400	.0025	.0004	
216, 000	1, 500	.0027	.0005	
230, 400	1, 600	.0030	.0005	E = 2,631,000 pounds per square inch.
244, 800	1, 700	.0033	.0007	
259, 200	1, 800	.0035	.0007	
273, 600	1, 900	.0037	.0007	
288, 000	2, 000	.0040	.0008	
316, 800	2, 200	.0045	.0009	
345. 600	2. 400	.0051	.0012	
374, 400	2, 600	.0058	.0013	
403, 200	2, 800	.0065	.0015	
432, 000	3, 000	.0074	.0018	
460, 800	3, 200	.0085	.0022	First crack.
489, 600	3, 400	.0096	.0025	
518, 400	3, 600	.0112	.0032	
547, 200	3, 800	.0132	.0039	
552, 000	3, 833	....	....	Ultimate strength.

Marks, 4.
Composition: Alpha cement, 1; sand, 1.
Water used, 24.03 per cent of cement.
Age, 75 days.
Set in mold 1 day, in water 74 days.
Weight per cubic foot, 140.07 pounds.
Sectional area, 144.60 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14, 460	100	0.	0.	Initial load.
28, 960	200	0.	....	
43, 280	300	.0001	....	
57, 840	400	.0001	....	
72, 300	500	.0003	....	
86, 760	600	.0004	0.	E = 6,250,000 pounds per square inch.
101, 220	700	.0005	....	
115, 680	800	.0007	....	
130, 140	900	.0009	....	
144, 600	1, 000	.0010	.0001	E = 5,000,000 pounds per square inch.
173, 520	1, 200	.0014	.0002	
202, 440	1, 400	.0017	.0002	E = 3,125,000 pounds per square inch.
231, 360	1, 600	.0022	.0003	
260, 280	1, 800	.0025	.0004	
289, 200	2, 000	.0030	.0005	
318, 120	2, 200	.0034	.0008	
347, 040	2, 400	.0040	.0008	
375, 960	2, 600	.0045	.0009	
404, 880	2, 800	.0050	.0011	
433, 800	3, 000	.0055	.0012	
462, 720	3, 200	.0062	.0013	
491, 640	3, 400	.0068	.0015	
520, 560	3, 600	.0075	.0017	
549, 480	3, 800	.0082	.0019	
578, 400	4, 000	.0090	.0023	
607, 320	4, 200	.0100	.0025	
636, 240	4, 400	.0108	.0028	
665, 160	4, 600	.0122	.0035	
694, 080	4, 800	.0185	.0043	Ultimate strength.

Marks, 40.
Composition: Alpha cement.
Water used, 20.89 per cent of cement.
Age, 7 days.
Set in mold 1 day, in water 6 days.
Weight per cubic foot, 134.64 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	.0001	0.	
43,236	300	.0002	0.	
57,648	400	.0003	0.	
72,060	500	.0006	.0001	
86,472	600	.0008	.0001	E = 3,571,000 pounds per square inch.
100,884	700	.0010	.0002	
115,296	800	.0013	.0002	
129,708	900	.0015	.0003	
144,120	1,000	.0018	.0004	E = 3,214,000 pounds per square inch.
172,944	1,200	.0023	.0005	
201,768	1,400	.0029	.0007	E = 2,083,000 pounds per square inch.
230,592	1,600	.0036	.0008	
259,416	1,800	.0042	.0009	
288,240	2,000	.0048	.0010	
317,064	2,200	.0054	.0011	
345,888	2,400	.0061	.0012	
374,712	2,600	.0066	.0013	
403,536	2,800	.0069	.0013	First crack.
546,400	4,058	....	....	Ultimate strength.

Marks, 41.
Composition: Alpha cement.
Water used, 18.08 per cent of cement.
Age, 33 days.
Set in mold 1 day, in water 32 days.
Weight per cubic foot, 138.02 pounds.
Sectional area, 144.12 square inches.
Gauged length, 5″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
14,412	100	0.	0.	Initial load.
28,824	200	.0001	0.	
43,236	300	.0002	0.	
57,648	400	.0003	0.	
72,060	500	.0004	0.	
86,472	600	.0005	0.	E = 5,000,000 pounds per square inch.
100,884	700	.0007	0.	
115,296	800	.0009	.0001	
129,708	900	.0010	.0001	
144,120	1,000	.0012	.0001	E = 4,091,000 pounds per square inch.
172,944	1,200	.0015	.0001	
201,768	1,400	.0018	.0001	E = 3,846,000 pounds per square inch.
230,592	1,600	.0020	.0002	
259,416	1,800	.0024	.0002	Corner cracked.
288,240	2,000	.0026	.0002	
317,064	2,200	.0029	.0002	
345,888	2,400	.0031	.0003	
374,712	2,600	.0035	.0003	
403,536	2,800	.0037	.0003	
432,360	3,000	.0040	.0003	
461,184	3,200	.0043	.0003	
490,008	3,400	.0045	.0004	
518,832	3,600	.0048	.0004	
547,656	3,800	.0051	.0004	
576,480	4,000	.0057	.0006	
605,304	4,200	.0058	.0005	
634,128	4,400	.0055	.0002	
662,952	4,600	.0054	—.0005	
697,776	4,800	.0027	—.0010	
720,600	5,000	.0029	—.0009	
800,000	5,551	....	....	Maximum load applied. Specimen not fractured. Ultimate strength not reached. The side on which the micrometer rested partly flaked off, thus accounting for the erratic readings for loads above 4,200 pounds per square inch.

Compressive strength of 12-inch cubes made at Watertown Arsenal, Mass.

Marks.	Brand of cement.	Composition.			Age.	Weight per cubic foot.	First crack.	Ultimate strength.	
		Cement.	Sand.	Stone.				Total.	Per square inch.
					Days.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
5	Alpha	1	1	3—Trap ⅜"	7	145.56	....	202,100	1,391
6	....	......	......	....	19	149	....	320,800	2,220
7	....	......	......	....	32	146.44	....	403,536	2,800
8	....	......	......	....	76	153.34	578,400	726,000	5,021
9	Alpha	1	1	3—Trap ¾"	8	147.01	....	273,372	1,900
10	....	......	......	....	20	150.12	345,600	398,800	2,769
11	....	......	......	....	32	148.27	....	464,256	3,200
12	Alpha	1	1	3—Trap 1"	7	159.26	428,000	488,100	3,390
13	....	......	......	....	20	160.65	373,464	611,000	4,254
14	....	......	......	....	34	160.88	377,832	714,500	4,917
15	....	......	......	....	73	158.54	636,768	763,000	5,272
16	Alpha	1	1	3—Trap ⅜", 1; trap 2½", 2.	7	158.81	346,752	404,544	2,800
17	....	......	......	....	19	156.73	519,264	546,100	3,786
18	....	......	......	....	34	158.91	494,496	632,500	4,349
19	....	......	......	....	74	159.35	579,360	658,200	4,544
20	Alpha	1	1	3—Trap ⅜", 1; trap 1", 1; trap 2½", 1.	7	158.18	389,000	404,208	2,800
21	....	......	......	....	19	159.76	492,456	602,000	4,156
22	....	......	......	....	34	159.38	552,216	697,536	4,800
23	....	......	......	....	73	161.91	750,672	800,000	*a*5,542
24	Steel......	1	1	3—Trap ¾"	7	151.86	187,044	202,600	1,408
25	....	......	......	....	21	154.02	231,168	286,100	1,980
26	....	......	......	....	31	150.18	231,360	248,100	1,716
27	....	......	......	....	70	155.91	330,000	357,500	2,464
28	Standard .	1	1	3—Trap ¾"	7	151.37	115,680	142,100	983
29	....	......	......	....	22	152.86	181,328	195,700	1,341
30	....	......	......	....	30	156.13	....	215,200	1,488
31	....	......	......	....	70	155.98	261,792	300,100	2,063
32	Star	1	1	3—Trap ¾"	7	153.85	318,884	339,000	2,342
33	....	......	......	....	22	151.01	....	318,912	2,200
34	....	......	......	....	31	156.59	461,568	491,000	3,404
35	....	......	......	....	69	160.33	637,824	672,000	4,636
36	Alpha	1	1	3—Pebbles ⅜"	7	146.76	173,376	187,600	1,298
37	....	......	......	....	21	150.51	....	375,960	2,600
38	....	......	......	....	34	147.02	....	435,900	2,992
39	....	......	......	....	70	148.76	....	562,000	3,870
42	Alpha	1	1	3—Trap 2½", 2; gravel ¼", 1.	7	155.93	....	259,632	1,800
43	....	......	......	....	23	157.24	519,264	549,000	3,806
44	....	......	......	....	32	160.53	691,776	724,100	5,024
45	....	......	......	....	67	158.26	461,568	678,000	4,700
46	Alpha	1	1	3—Pebbles 1½"...	7	149.63	....	329,900	2,276
47	....	......	......	....	22	151.75	....	463,000	3,186
48	....	......	......	....	29	151.51	378,144	555,200	3,817
49	....	......	......	....	61	150.89	435,600	583,500	4,018
50	Alpha	1	1	3—Pebbles ⅜", 1; pebbles 1½", 2.	8	148.26	261,576	289,800	1,994
51	....	......	......	....	23	151.38	430,000	436,100	3,023
52	....	......	......	....	32	150.76	492,456	550,392	3,800
53	....	......	......	....	61	150.87	492,864	505,900	3,490
54	Alpha	1	1	3—Gravel ¼", 1; pebbles ⅜", 1; pebbles 1½", 1.	7	145.27	....	214,100	1,486
55	....	......	......	....	22	149.74	....	384,000	2,676
56	....	......	......	....	32	148.26	405,216	434,160	3,000
57	....	......	......	....	65	147.89	....	550,392	3,800

Compressive strength of 12-inch cubes made at Watertown Arsenal, Mass.—Continued.

Marks.	Brand of cement.	Composition.			Age.	Weight per cubic foot.	First crack.	Ultimate strength.	
		Cement.	Sand.	Stone.				Total.	Per square inch.
					Days.	*Pounds.*	*Pounds,*	*Pounds.*	*Pounds.*
58	Alpha	1	1	3—Trap 2½"	7	158.37	288,720	346,464	2,400
59	....	......	......	....	22	159.27	465,792	603,000	4,143
60	....	......	......	....	32	161.44	290,000	598,200	4,140
61	....	......	......	....	65	161.76	550,848	655,700	4,523
62	Alpha	1	1	3—Trap 2½", 1; pebbles ⅜", 1; gravel ½", 1.	7	148.63	....	220,100	1,520
63	....	......	......	....	22	152.48	....	405,888	2,800
64	....	......	......	....	32	151	....	389,500	2,700
65	Alpha	1	3	6—Trap 1"	8	152.27	101,136	121,500	841
66	....	......	......	....	8	151.64	86,472	125,900	874
67	....	......	......	....	17	152.01	173,088	197,300	1,368
68	....	......	......	....	21	151.64	208,112	210,600	1,452
69	....	......	......	....	20	151.63	....	244,597	1,700
70	....	......	......	....	42	153.91	287,760	328,500	2,283
71	....	......	......	....	42	150.12	289,680	304,300	2,101
72	Egypt	1	1	3—Trap 1"	8	153.51	....	256,100	1,770
73	....	......	......	....	21	157.60	318,912	374,200	2,581
74	....	......	......	....	42	153.07	261,360	290,400	2,000
75	....	......	......	....	61	154.73	365,000	376,896	2,600
82	Alpha	1	1	3—Pebbles 3"	11	151.36	380,000	405,216	2,800
83	....	......	......	....	26	150.68	404,544	491,232	3,400
84	....	......	......	....	41	153.60	548,112	605,808	4,200
85	....	......	......	....	46	153.21	480,000	492,048	3,400
86	Alpha	1	1	3—Trap 1½"	11	157.80	434,160	461,500	3,189
87	....	......	......	....	26	160.56	580,000	579,200	4,006
88	....	......	......	....	41	161.14	605,808	658,000	4,562
89	....	......	......	....	48	157.39	....	372,000	2,583
90	Alpha	1	0	1½—Trap ¾"	11	151.89	318,384	595,800	4,117
91	....	......	......	....	25	153.02	463,104	605,000	4,180
92	....	......	......	....	38	150.50	483,800	445,000	3,077
93	....	......	......	....	48	155.57	524,448	640,992	4,400

a Not fractured.

TABLE NO. 2—CEMENT AND MORTAR TESTS.

Compressive strength of 12-inch cubes made at Watertown Arsenal, Mass.

Marks.	Brand of cement.	Composition.		Age.	Weight per cubic foot.	First crack.	Ultimate strength.	
		Cement.	Sand.				Total.	Per square inch.
				Days.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
1	Alpha	1	1	21	141.64	461,952	684,100	4,739
2	....	....	....	31	141.22	....	637,296	4,400
3	....	....	....	7	139.37	460,800	552,000	3,838
4	....	....	....	75	140.07	....	694,080	4,800
40	Alpha	Neat.	0	7	134.64	403,536	546,400	4,058
41	....	....	....	33	138.02	259,416	800,000	*a* 5,551

a Not fractured.

TABLE NO. 3.—CONCRETE TESTS.

Elastic properties of 12-inch cubes made at Watertown Arsenal, Mass.

Gauged length, 5".

Marks.	Brand of cement.	Composition.			Age.	Modulus of elasticity between loads per square inch of—			Permanent sets after loads per square inch of—			Compressive strength per square inch.
		Cement.	Sand.	Stone.		100 and 600.	100 and 1,000.	1,000 and 2,000.	600.	1,000.	2,000.	
					Days.	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Pounds.*
5	Alpha	1	1	3—Trap ½"	7	2,500,000	1,875,000	....	0.	.0003	....	1,391
6	....	....	....	....	19	2,500,000	2,500,000	962,000	.0001	.0006	.0058	2,220
7	....	....	....	....	32	3,571,000	3,750,000	2,174,000	.0002	.0006	.0010	2,800
8	....	....	....	....	76	4,167,000	3,750,000	3,571,000	0.	0.	.0002	5,021
9	Alpha	1	1	3—Trap ¾"	8	3,571,000	3,214,000	....	.0001	.0004	....	1,900
10	....	....	....	....	20	2,778,000	2,368,000	1,250,000	.0003	.0009	.0030	2,769
11	....	....	....	....	32	8,333,000	5,625,000	3,571,000	0.	0.	—.0001	8,200
12	Alpha	1	1	3—Trap 1"	7	5,000,000	4,091,000	3,333,000	0.	0.	.0007	3,390
13	....	....	....	....	20	8,333,000	6,429,000	5,000,000	0.	0.	.0002	4,254
14	....	....	....	....	34	6,250,000	5,625,000	3,571,000	.0001	.0002	.0006	4,917
15	....	....	....	....	73	8,333,000	5,625,000	4,545,000	0.	.0001	.0004	5,272
16	Alpha	1	1	3—Trap ½", 1; trap 2½, 2	7	5,000,000	5,000,000	3,571,000	0.	.0001	.0003	2,800
17	....	....	....	....	19	5,000,000	4,500,000	3,125,000	.0001	.0002	.0004	3,786
18	....	....	....	....	34	8,333,000	7,500,000	6,250,000	0.	.0001	0.	4,349
19	....	....	....	....	74	6,250,000	5,625,000	4,167,000	0.	.0001	.0004	4,544
20	Alpha	1	1	3—Trap 2½", 1; trap 1", 1; trap ½", 1	7	4,167,000	3,461,000	2,174,000	.0001	.0003	.0021	2,800
21	....	....	....	....	19	6,250,000	4,500,000	4,167,000	0.	0.	.0003	4,156
22	....	....	....	....	34	8,333,000	5,625,000	5,555,000	0.	0.	.0001	4,800
23	....	....	....	....	73	8,333,000	7,500,000	6,250,000	0.	0.	.0001	*a*5,542
24	Steel	1	1	3—Trap ¾"	7	1,923,000	1,406,000	....	.0019	.0072	....	1,408
25	....	....	....	....	21	3,125,000	3,000,000	....	.0001	.0009	....	1,980
26	....	....	....	....	31	3,125,000	2,500,000	....	.0001	.0011	....	1,716
27	....	....	....	....	70	3,571,000	3,000,000	1,282,000	0.	.0004	.0117	2,464
28	Standard	1	1	3—Trap ¾"	7	1,000,000	....	....	.0082	....	....	983
29	....	....	....	....	22	1,667,000	....	....	.0024	.0146	....	1,341
30	....	....	....	....	30	3,571,000	2,250,000	....	.0002	.0016	....	1,488
31	....	....	....	....	70	2,273,000	2,143,000	....	.0010	.0025	....	2,063

a Not fractured.

Elastic properties of 12-inch cubes made at Watertown Arsenal, Mass.—Continued.

Marks.	Brand of cement.	Composition.			Age.	Modulus of elasticity between loads per square inch of—			Permanent sets after loads per square inch of—			Compressive strength per square inch.
		Cement.	Sand.	Stone.		100 and 600.	100 and 1,000.	1,000 and 2,000.	600.	1,000.	2,000.	
					Days.	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Pounds.*
32	Star	1	1	3—Trap ¾"	7	5,000,000	3,750,000	1,163,000	.0001	.0005	.0044	2,342
33					22	3,571,000	3,461,000	1,136,000	0.	.0004	.0059	2,200
34					31	5,000,000	4,500,030	3,333,000	0.	.0001	.0003	3,404
35					69	6,250,000	5,000,000	4,167,000	0.	.0001	.0005	4,636
36	Alpha	1	1	3—Pebbles ⅜"	7	2,273,000	1,800,000		.0001	.0009		1,298
37					21	3,571,000	3,750,000	2,778,000	0.	.0003	.0003	2,600
38					34	4,167,000	3,461,000		.0001	.0002		2,992
39					70	3,125,000	3,214,000	3,333,000	.0001	.0002	.0007	3,870
42	Alpha	1	1	3—Trap 2½", 2; gravel ⅛", 1	7	3,571,000	3,000,000		.0001	.0005		1,800
43					23	6,250,000	5,000,000	3,125,000	.0001	.0002	.0008	3,806
44					32	6,250,000	5,625,000	5,000,000	0.	0.	—.0001	5,024
45					67	12,500,000	6,429,000	5,555,000	0.	0.	0.	4,700
46	Alpha	1	1	3—Pebbles 1½"	7	3,571,000	3,750,000	1,562,000	.0001	.0004	.0022	2,276
47					22	5,000,000	4,091,000	2,941,000	0.	.0001	.0004	3,186
48					29	4,167,000	3,750,000	3,125,000	.0001	.0002	.0008	3,817
49					61	2,778,000	3,000,000	1,724,000	.0001	.0005	.0010	4,018
50	Alpha	1	1	3—Pebbles ⅜", 1; pebbles 1½", 2	8	3,125,000	2,812,000		.0002	.0005		1,994
51					23	4,167,000	3,461,000	3,846,000	.0001	.0001	.0001	3,023
52					32	4,167,000	4,091,000	3,333,000	.0001	.0002	.0005	3,800
53					61	5,000,000	4,500,000	2,631,000	.0001	.0003	.0011	3,490
54	Alpha	1	1	3—Gravel ⅛", 1; pebbles ⅜", 1; pebbles 1½", 1	7	1,923,000	1,800,000		.0005	.0019		1,486
55					22	4,167,000	3,214,000	2,174,000	.0001	.0001	.0007	2,676
56					32	3,125,000	3,461,000	2,500,000	0.	.0002	.0008	3,000
57					65	3,125,000	3,214,000	2,941,000	0.	.0002	.0008	3,800
58	Alpha	1	1	3—Trap 2½"	7	3,125,000	3,214,000		.0003	.0007	.0054	2,400
59					22	8,333,000	5,625,000	7,143,000	.0001	.0002	.0003	4,143
60					32	5,000,000	4,500,000	3,333,000	0.	.0001	.0008	4,140
61					65	12,500,000	7,500,000	3,846,000	0.	0.	.0001	4,523
62	Alpha	1	1	3—Trap 2½", 1; pebbles ⅜", 1; gravel ⅛", 1.	7	2,778,000	2,045,000		.0002	.0005		1,520
63					22	5,000,000	4,500,000	2,631,000	.0001	.0002	.0006	2,800
64					32	4,167,000	3,750,000	2,941,000	.0001	.0001	.0001	2,700

65	Alpha	1	3	6—Trap 1"	8	961,000			.0137			841
66					8				.0142			874
67					17	2,083,000	1,452,000		.0008	.0061		1,368
68					21	1,562,000	1,500,000		.0019	.0057		1,452
69					20	2,083,000	1,800,000		.0004	.0029		1,700
70					42	3,125,000	2,647,000	1,889,000	.0002	.0010	.0060	2,283
71					42	3,125,000	2,500,000	1,064,000	.0002	.0009	.0076	2,101
72	Egypt	1	1	3—Trap 1"	8	3,571,000	2,647,000		.0003	.0008		1,770
73					21	3,571,000	2,647,000	1,064,000	.0003	.0008	.0090	2,581
74					42	3,125,000	2,045,000		.0005	.0022		2,000
75					61	5,000,000	4,091,000	3,833,000	.0001	.0001	.0010	2,600
82	Alpha	1	1	3—Pebbles 1½" to 3"	11	3,125,000	3,461,000	2,273,000	.0001	.0004	.0023	2,800
83					26	5,000,000	4,091,000	3,125,000	0.	0.	.0001	3,400
84					41	3,125,000	3,750,000	3,571,000	.0001	.0003	.0010	4,200
85					46	5,000,000	4,500,000	3,333,000	0.	.0001	.0010	3,400
86	Alpha	1	1	3—Trap 1½"	11	5,000,000	4,500,000	3,125,000	.0001	.0002	.0014	3,189
87					26	4,167,000	5,625,000	3,125,000	0.	.0003	.0011	4,006
88					41	6,250,000	5,000,000	5,000,000	0.	0.	.0001	4,562
89					48	4,167,000	4,091,000	2,778,000	0.	.0002	.0014	2,583
90	Alpha	1	0	1½—Trap ¾"	11	4,167,000	4,500,000	3,125,000	0.	.0001	.0004	4,117
91					25	5,000,000	4,091,000	3,571,000	0.	0.	.0002	4,180
92					38	6,250,000	4,091,000	3,125,000	0.	0.	.0002	3,077
93					43	6,250,000	5,000,000	4,545,000	0.	0.	.0002	4,400

TABLE NO. 4.—CEMENT AND MORTAR TESTS.

Elastic properties of 12-inch cubes made at Watertown Arsenal, Mass.

Gauged length, 5″.

Marks.	Brand of cement.	Composition.		Age.	Modulus of elasticity between loads per square inch of—			Permanent sets after loads per square inch of—			Compressive strength per square inch.
		Cement.	Sand.		100 and 600.	500 and 1,000.	1,000 and 2,000.	600.	1,000.	2,000.	
				Days.	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Pounds.*
1	Alpha.	1	1	21	4,167,000	4,500,000	3,571,000	0.	.0001	.0002	4,739
2	....	....	....	31	5,000,000	5,000,000	5,555,000	.0001	.0002	.0001	4,400
3	....	....	....	7	4,167,000	3,461,000	2,631,000	.0001	.0001	.0008	3,833
4	....	....	....	75	6,250,000	5,000,000	3,125,000	0.	.0001	.0005	4,800
40	Alpha.	Neat.	0	7	3,571,000	3,214,000	2,083,000	.0001	.0004	.0010	4,058
41	....	....	....	83	5,000,000	4,091,000	3,846,000	0.	.0001	.0002	*a* 5,551

a Not fractured.

TABLE NO. 5.—CONCRETE TESTS—12-INCH CUBES.

Summarized table showing the strength of concrete made of different-sized stone at different ages.

Composition, 1:1:3, Alpha cement.

Kind of stone.	First group.		Second group.		Third group.		Fourth group.	
	Age.	Compressive strength per square inch.	Age.	Compressive strength per square inch.	Age.	Compressive strength per square inch.	Age.	Compressive strength per square inch.
	Days.	*Pounds.*	*Days.*	*Pounds.*	*Days.*	*Pounds.*	*Days.*	*Pounds.*
Trap ½″..................	7	1,391	19	2,220	32	2,800	76	5,021
Trap ¾″..................	8	1,900	20	2,769	32	3,200	....	....
Trap 1″..................	7	3,390	20	4,254	34	4,917	78	5,272
Trap 1½″..................	7	2,276	22	3,186	29	3,817	61	4,018
Trap 1½″..................	11	3,189	26	4,006	41 48	4,562 2,583	....	....
Trap 2½″..................	7	2,400	22	4,143	32	4,140	65	4,523
Pebbles ⅜″..................	7	1 298	21	2,600	34	2,992	70	3,870
Pebbles 1½″..................	7	2,276	22	3,186	29	3,817	61	4,018
Pebbles 3″..................	11	2,800	26	3,400	41 46	4,200 3,400	....	....
Trap ½″, 1; trap 2½″, 2..	7	2,800	19	3,786	34	4,849	74	4,544
Trap ½″, 1; trap 1″, 1; trap 2½″, 1..........	7	2,800	19	4,156	34	4,800	78	*a* 5,512
Trap 2½″, 2; gravel ½″, 1.	7	1,800	23	3,806	32	5,024	67	4,700
Trap 2½″, 1; pebbles ⅜″, 1; gravel ½″, 1........	7	1,520	22	2,800	32	2,700	....	....
Pebbles ⅜″, 1; pebbles 1½″, 2..................	8	1,994	23	3,023	32	3,800	61	3,490
Gravel ½″, 1; pebbles ⅜″, 1; pebbles 1½″, 1...	7	1,486	22	2,676	32	3,000	65	3,800

a Not fractured.

TABLE No. 6.

Weights and volumes of the ingredients and of the resulting concretes.

Brand of cement.	Cement.		Sand.		Stone.		Water used.		Concrete produced.	Mean weight per cubic foot, when tested.	Description of stone.
	Cubic feet.	Weight.	Cubic feet.	Weight.	Cubic feet.	Weight.	Weight.	Volume.			
		Pounds.		*Pounds.*		*Pounds.*	*Pounds.*	*Cu. ft.*	*Cu. ft.*	*Pounds.*	
Alpha ...	1	103	1	99	3	314	31	.497	3.75	148.58	Trap ½".
Do ...	1	103½	1	97½	3	299	32½	.521	....	148.47	Trap ¾".
Do ...	1	105¾	1	98¾	3	297½	33	.529	3.375	159.83	Trap 1".
Do ...	1	106	1	104	3	296½	31	.497	3.417	158.45	Trap ½", 1; trap 2½", 2.
Do ...	1	100	1	99	3	306½	31½	.505	3.375	159.81	Trap ½", 1; trap 1", 1; trap 2½", 1.
Steel	1	83	1	98½	3	286	30½	.489	3.312	152.98	Trap ¾".
Standard	1	85	1	101	3	288	35	.561	3.292	154.08	Do.
Star	1	99	1	100½	3	291½	31	.497	3.459	155.45	Do.
Alpha ...	1	104	1	94	3	305	36½	.585	3.625	148.26	Pebbles ¾".
Do ...	1	100	1	104	3	296	21¾	.341	3.333	157.99	Trap 2½", 2; gravel ¾", 1.
Do ...	1	104¾	1	95	3	293¾	31	.497	3.50	150.95	Pebbles 1½".
Do ...	1	97½	1	95	3	296½	31½	.505	3.459	150.32	Pebbles ¾", 1; pebbles 1½", 2.
Do ...	1	98	1	93½	3	301	33	.529	3.542	147.79	Gravel ½", 1; pebbles ¾", 1; pebbles 1½", 1.
Do ...	1	102½	1	94	3	295	29½	.473	3.333	160.21	Trap 2½".
Do ...	1	96½	1	93½	3	294½	32½	.521	....	150.70	Trap 2½", 1; pebbles ¾", 1; gravel ½". 1.
Do ...	1	99	3	282	6	563	64	1.027	6.592	151.89	Trap 1".
Egypt ...	1	82½	1	94½	3	280	33	.529	3.208	154.73	Do.
Alpha ...	1	99	1	94½	3	279	29½	.473	3.271	152.20	Pebbles 3".
Do ...	1	102	1	95½	3	282	31	.497	3.167	159.22	Trap 1½".
Do ...	2	197	0	0	3	270½	41	.658	3.459	152.74	Trap ½".

TABLE No. 7.

Weights and volumes of ingredients and of the resulting mortar.

ALPHA CEMENT.

Cement.		Sand.		Water used.		Mortar produced.	Mean weight per cubic foot when tested.
Cubic feet.	Weight.	Cubic feet.	Weight.	Weight.	Volume.		
	Pounds.		*Pounds.*	*Pounds.*	*Cubic feet.*	*Cubic feet.*	*Pounds.*
1	89	1	94	22	.358	1.458	141.43
1	103	1	96½	24¾	.397	1.583	139.72
1	102½	2	183	31	.497	2.307	131.26

TABLE No. 8.

Weight per cubic foot, and voids in the stone used in the manufacture of concrete.

The weight of the broken stone was the mean of 5 cubic feet. One cubic foot only of the sand and gravel was weighed.

Kind of stone.	Weight per cubic foot.		Voids.	
	Loose.	Rammed.	Loose.	Rammed.
	Pounds.	*Pounds.*	*Per cent.*	*Per cent.*
½" trap rock	91.65	109.25	46.3	36.0
¾" trap rock	89.4	102.6	49.9	42.3
1" trap rock	89.6	103	50.3	42.7
1½" trap rock	93.1	105.35	47.3	40.0
2½" trap rock	92.35	102.05	49.6	44.1
½" gravel	102	116.25	32.1	24.1
⅛" sand	94	108	36.1	27.7

CEMENT AND MORTAR PRISMS

MADE AT

WATERTOWN ARSENAL, MASS.

CEMENT AND MORTAR PRISMS, 6″ × 6″ × 18″.

Marks, 1.
Composition: Alpha cement.
Water used, 18.97 per cent of cement.
Age, 7 days.
Set in mold 2 days, in water 5 days.
Sectional area, 36.36 square inches.
Length, 17″.92.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,636	100	0.	0.	Initial load.
7,272	200	.0001	0.	
10,908	300	.0001	0.	
14,544	400	.0003	0.	
18,180	500	.0005	0.	
21,816	600	.0007	0.	E = 7,143,000 pounds per square inch.
25,452	700	.0010	0.	
29,088	800	.0012	— .0001	
32,724	900	.0015	— .0001	
36,360	1,000	.0018	0.	E = 5,000,000 pounds per square inch.
43,632	1,200	.0023	0.	
50,904	1,400	.0025	0.	E = 8,333,000 pounds per square inch.
58,176	1,600	.0028	0.	
65,448	1,800	.0029	0.	
72,720	2,000	.0030	0.	
79,992	2,200	.0032	0.	
87,264	2,400	.0035	.0001	
94,536	2,600	.0038	.0001	
101,808	2,800	.0041	.0001	Corner cracked.
109,080	3,000	.0044	.0001	Crack at one end.
116,352	3,200	.0047	.0001	
123,624	3,400	.0050	.0001	
130,896	3,600	.0054	.0001	
138,168	3,800	.0058	.0001	
145,440	4,000	.0065	.0001	
152,712	4,200	.0072	.0002	
159,984	4,400	.0079	.0002	
173,900	4,783	....	....	Ultimate strength.

Pyramidal development at one end, with general failure by splitting longitudinally.

Marks, 6.
Composition: Alpha cement.
Water used, 19.71 per cent of cement.
Age, 7 days.
Set in mold 2 days, in water 5 days.
Sectional area, 36.12 square inches.
Length, 17″.92.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,612	100	0.	0.	Initial load.
7,224	200	.0001	0.	
10,836	300	.0003	0.	
14,448	400	.0006	0.	
18,060	500	.0009	0.	
21,672	600	.0012	0.	E=4,167,000 pounds per square inch.
25,284	700	.0015	0.	
28.896	800	.0019	0.	
32,508	900	.0022	0.	
36,120	1,000	.0025	0.	E=3,600,000 pounds per square inch.
43,344	1,200	.0031	0.	
50,568	1,400	.0036	0.	E=3,448,000 pounds per square inch.
57.702	1,600	.0042	0.	
65.016	1,800	.0049	.0002	
72.240	2,000	.0056	.0002	
79,464	2,200	.0062	.0003	
86,688	2,400	.0069	.0004	
93,912	2,600	.0076	.0004	
101.136	2,800	.0082	.0005	
108,360	3,000	.0089	.0005	
115,584	3,200	.0098	.0007	
122,808	3,400	.0106	.0008	
130,032	3,600	.0112	.0009	
137,256	3,800	.0121	.0009	
144,480	4,000	.0130	.0010	
151,704	4,200	.0138	.0011	
158,928	4,400	.0146	.0013	First crack.
166,152	4,600	.0157	.0014	
173,376	4,800	.0168	.0015	
180,600	5,000	....	....	Ultimate strength.

Marks, 15.
Composition: Alpha cement, 1; fine sand, 1.
Water used, 22.89 per cent of cement.
Age, 15 days.
Set in mold 1 day, in water 14 days.
Weight per cubic foot, 137.86 pounds.
Sectional area, 36.66 square inches.
Length, 17″.95.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,666	100	0.	0.	Initial load.
7,332	200	.0001	0.	
10,998	300	.0005	—.0001	
14,664	400	.0008	—.0002	
18,330	500	.0011	—.0002	
21,996	600	.0014	—.0002	E = 3,125,000 pounds per square inch.
25,662	700	.0017	—.0002	
29,328	800	.0022	—.0002	
32,994	900	.0026	—.0002	
36,660	1,000	.0030	—.0002	E = 2,812,000 pounds per square inch.
43,992	1,200	.0039	—.0001	
51,324	1,400	.0048	0.	E = 2,326,000 pounds per square inch.
58,656	1,600	.0059	+.0002	
65,988	1,800	.0070	.0005	
73,320	2,000	.0082	.0007	
80,652	2,200	.0093	.0010	
87,984	2,400	.0104	.0012	
95,316	2,600	.0123	.0020	
102,648	2,800	.0137	.0024	
109,980	3,000	.0154	.0030	
117,312	3,200	.0175	.0038	
124,644	3,400	.0199	.0047	
131,976	3,600	.0229	.0060	
139,308	3,800	.0263	.0076	Cracks at one end.
141,000	3,846	....	....	Ultimate strength.

Failed by opening an oblique crack along length of prism.

Marks, 19.
Composition: Alpha cement, 1; fine sand, 1.
Water used, 22.28 per cent of cement.
Age, 36 days.
Set in mold 1 day, in water 35 days.
Weight per cubic foot, 138.57 pounds.
Sectional area, 36.36 square inches.
Length, 17″.92.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3, 636	100	0.	0.	Initial load.
7, 272	200	.0004	0.	
10, 908	300	.0008	0.	
14, 544	400	.0013	0.	
18, 180	500	.0017	0.	
21, 816	600	.0021	0.	E = 2,381,000 pounds per square inch.
25, 452	700	.0025	0.	
29, 088	800	.0030	.0001	
32, 724	900	.0034	.0001	
36, 360	1, 000	.0038	.0002	E = 2,500,000 pounds per square inch.
43. 632	1, 200	.0045	.0003	
50, 904	1, 400	.0054	.0004	E = 2,941,000 pounds per square inch.
58. 176	1. 600	.0062	.0006	
65, 448	1, 800	.0072	.0011	
72. 720	2. 000	.0082	.0012	
79, 992	2. 200	.0091	.0014	
87, 264	2. 400	.0102	.0018	
94. 536	2, 600	.0114	.0023	
101, 808	2, 800	.0127	.0028	
109, 080	3, 000	.0143	.0034	
116. 352	3, 200	.0154	.0038	
123, 624	3, 400	.0177	.0048	
130, 896	3, 600	.0190	.0052	
138, 168	3, 800	.0209	.0060	
145. 440	4, 000	.0223	.0066	
152, 712	4, 200	.0248	.0078	
159, 984	4, 400	.0271	.0087	
167, 256	4. 600	.0297	.0101	
173. 200	4, 763	....	....	Ultimate strength.

Water used, 22.28 per cent of cement.
Age, 36 days.
Set in mold 1 day, in water 35 days.
Weight per cubic foot, 138.23 pounds.
Sectional area, 36.42 square inches.
Length, 18″.02.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,642	100	0.	0.	Initial load.
7,284	200	.0003	0.	
10,926	300	.0008	0.	
14,568	400	.0012	0.	
18,210	500	.0015	0.	
21,852	600	.0020	.0001	E = 2,632,000 pounds per square inch.
25,494	700	.0023	.0001	
29,136	800	.0027	.0001	
32,778	900	.0031	.0001	
36,420	1,000	.0035	.0002	E = 2,727,000 pounds per square inch.
43,704	1,200	.0042	.0003	
50,988	1,400	.0050	.0005	E = 3,030,000 pounds per square inch.
58,272	1,600	.0058	.0006	
65,556	1,800	.0067	.0008	
72,840	2,000	.0076	.0010	
80,124	2,200	.0086	.0013	
87,408	2,400	.0095	.0015	
94,692	2,600	.0105	.0017	
101,976	2,800	.0115	.0020	
109,260	3,000	.0125	.0022	
116,544	3,200	.0136	.0024	
123,828	3,400	.0146	.0027	
131,112	3,600	.0160	.0032	
138,396	3,800	.0176	.0036	
145,680	4,000	.0192	.0042	
152,964	4,200	.0208	.0049	
160,248	4,400	.0230	.0058	
167,532	4,600	.0257	.0071	
174,816	4,800	.0294	.0086	
180,200	4,948	....	....	Ultimate strength.

Marks, 21.
Composition: Alpha cement, 1; fine sand, 2.
Water used, 30.24 per cent of cement.
Age, 15 days.
Set in mold 1 day, in water 14 days.
Weight per cubic foot, 131.36 pounds.
Sectional area, 36.48 square inches.
Length, 18′ .02.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3, 648	100	0.	0.	Initial load.
7, 296	200	.0005	0.	
10, 944	300	.0011	0.	
14, 592	400	.0017	.0001	
18, 240	500	.0026	.0004	
21, 888	600	.0034	.0005	E=1,724,000 pounds per square inch.
25, 536	700	.0044	.0009	
29, 184	800	.0054	.0011	
32, 832	900	.0068	.0016	
36, 480	1, 000	.0084	.0023	E=1,475,000 pounds per square inch.
43, 776	1, 200	.0141	.0055	
50, 200	1, 876	....	....	Ultimate strength.

Marks, 23.
Composition: Alpha cement, 1; fine sand, 2.
Water used, 30.24 per cent of cement.
Age, 36 days.
Set in mold 1 day, in water 35 days.
Weight per cubic foot, 128.59 pounds.
Sectional area, 36.54 square inches.
Length, 18″.02.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3, 654	100	0.	0.	Initial load.
7, 308	200	.0004	0.	
10, 962	300	.0008	0.	
14, 616	400	.0012	0.	
18, 270	500	.0018	.0001	
21, 924	600	.0023	.0001	E=2,273,000 pounds per square inch.
25, 578	700	.0030	.0003	
29, 232	800	.0035	.0004	
32, 886	900	.0042	.0005	
36, 540	1, 000	.0047	.0006	E=2,195,000 pounds per square inch.
43, 848	1, 200	.0060	.0008	
51, 156	1, 400	.0074	.0013	E=1,538,000 pounds per square inch.
58, 464	1, 600	.0096	.0018	
65, 772	1, 800	.0118	.0026	
73, 080	2, 000	.0146	.0040	
79, 800	2, 184	....	....	Ultimate strength.

Marks, 25.
Composition: Alpha cement, 1; fine sand, 2.
Water used, 30.24 per cent of cement.
Age, 38 days.
Set in mold 1 day, in water 37 days.
Weight per cubic foot, 133.83 pounds.
Sectional area, 36.66 square inches.
Length, 18″.05.
Gauged length, 10″.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,666	100	0.	0.	Initial load.
7,332	200	.0002	0.	
10,998	300	.0005	—.0001	
14,664	400	.0009	0.	
18,330	500	.0014	0.	
21,996	600	.0018	0.	E = 2,778,000 pounds per square inch.
25,662	700	.0022	.0001	
29,328	800	.0026	.0001	
32,994	900	.0031	.0002	
36,660	1,000	.0036	.0004	E = 2,812,000 pounds per square inch.
43,992	1,200	.0045	.0006	
51,324	1,400	.0057	.0009	E = 2,325,000 pounds per square inch.
58,656	1,600	.0067	.0011	
65,988	1,800	.0082	.0016	
73,320	2,000	.0095	.0020	
80,652	2,200	.0110	.0024	
87,984	2,400	.0129	.0031	
95,316	2,600	.0153	.0041	
101,000	2,755	....	....	Ultimate strength.

TABLE NO. 1.—CEMENT AND MORTAR PRISMS.

Compressive strength of prisms 6″ × 6″ by 18″ long, made at Watertown Arsenal, Mass.

Marks.	Brand of cement.	Composition.		Age.	First crack.	Ultimate strength.	
		Cement.	Sand.			Total.	Per square inch.
				Days.	*Pounds.*	*Pounds.*	*Pounds.*
1	Alpha.........................	Neat....	0	7	101,808	173,900	4,783
6	....	....	....	7	158,928	180,600	5,000
15	Alpha.........................	1	1	15	139,308	141,000	3,846
19	....	....	....	36	....	173,200	4,763
20	....	....	....	36	....	180,200	4,948
21	Alpha.........................	1	2	15	....	50,200	1,376
23	....	....	....	36	....	79,800	2,184
25	....	....	....	38	....	101,000	2,755

TABLE NO. 2.—CEMENT AND MORTAR PRISMS.

Elastic properties of prisms, 6″ × 6″ by 18″ long, made at Watertown Arsenal, Mass.

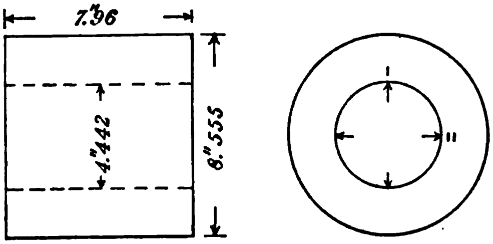
Gauged length, 10″.

Marks.	Brand of cement.	Composition.		Age.	Modulus of elasticity between loads per square inch of—			Permanent sets after loads per square inch of—			Compressive strength per square inch.
		Cement.	Sand.		100 and 600.	100 and 1,000.	1,000 and 2,000.	600.	1,000.	2,000.	
				Days.	*Pounds.*	*Pounds.*	*Pounds.*	*Inch.*	*Inch.*	*Inch.*	*Pounds.*
1	Alpha.	Neat.	0	7	7,143,000	5,000,000	8,333,000	0.	0.	0.	4,783
6	....	....	....	7	4,167,000	3,600,000	3,448,000	0.	0.	.0002	5,000
15	Alpha.	1	1	15	3,125,000	2,812,000	2,326,000	—.0002	—.0002	.0007	3,846
19	....	....	....	36	2,381,000	2,500,000	2,941,000	0.	.0002	.0012	4,763
20	....	....	....	36	2,632,000	2,727,000	3,030,000	.0001	.0002	.0010	4,948
21	Alpha.	1	2	15	1,724,000	1,475,000	....	.0005	.0023	....	1,376
23	....	....	....	36	2,273,000	2,195,000	1,538,000	.0001	.0006	.0040	2,184
25	....	....	....	38	2,778,000	2,812,000	2,325,000	0.	.0004	.0020	2,755

CUBIC COMPRESSION OF STONES.

SAMPLES OF STONE IMMERSED IN WATER IN AN HYDROSTATIC CYLINDER AND SUBJECTED TO PRESSURE.

The hydrostatic cylinder used was made from a section of a 5-inch single forging gun having the following dimensions:



Diameters I and II at middle of length were measured before and after subjecting the cylinder to interior pressure.

Micrometer observations before loading: Diameters—

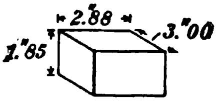
I.	II.
″.0263	″.0286.

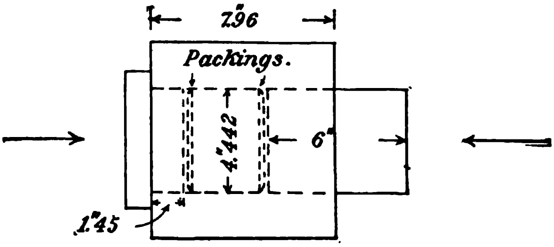
Sample of Oolitic limestone experimented with: Stone from No. 444 transverse test. (See page 401, Report of Tests of 1895.)

Material from the Salem Bedford Stone Company, from quarries at Bedford, Ind.

No. 9339.

DIMENSIONS OF STONE.





Sectional area of bore, 15.5 square inches.

Applied load, 465,000 pounds = 30,000 pounds per square inch pressure in the bore.

Stone apparently uninjured by the pressure.

Stone weighed after removal from the cylinder, while wet, 664 grams; weight after drying, 641 grams; loss, 23 grams = 3.5 per cent.

Measurement of bore of cylinder: Diameters—

I.	II.
″.0263	″.0288.

No. 9340.

Stones incased in sealed brass cases, then placed in the hydrostatic cylinder and loads applied to each of 465,000 pounds = 30,000 pounds per square inch pressure in the bore.

Original transverse test number.	Description of stone.
441	Limestone from Bridgeford and Duncan quarries at Beaver, Carroll County, Ark.
444	Oolitic limestone from the Salem-Bedford Stone Co.'s quarries at Bedford, Ind.
455	Marble from Kenesaw quarry. } From Georgia Marble Co., of Tate, Pickens County, Ga.
456	Marble from Etowah quarry.. }

NOTE.—It was found that the brass case leaked, admitting water to the stone No. 441.

Free compression tests of stones after having been subjected to cubic compression in hydrostatic cylinder with 30,000 pounds per square inch.

Original transverse test number.	Dimensions.			Sectional area.	First crack.	Ultimate strength.	
	Height.	Compressed surface.				Total.	Per square inch.
	Inches.	*Inches.*	*Inches.*	*Sq. inches.*	*Pounds.*	*Pounds.*	*Pounds.*
441	2.00	3.00	2.94	8.82	161,000	206,700	23,435
444	1.86	2.92	2.98	8.70	101,700	101,700	11,690
*444	1.88	2.99	2.88	8.61	56,000	81,800	9,501
455	1.94	3.15	2.88	9.07	111,900	111,900	12.337
456	1.95	3.13	2.90	9.08	120,200	120,200	13,237

* Subjected to hydrostatic pressure without brass case. Test No. 9339.

CORDAGE.

MANILA ROPE, 4 STRANDS, WITH AND WITHOUT HEARTS.

Ends secured to the testing machine by means of eye splices.

No. of test.	Description.	Nominal circumference.	Actual circumference.	Lay, one turn in.	Number of yarns in each strand.	Number of yarns in heart.	Total number of yarns in rope.	Tensile strength.	Parted.
		Inches.	*Inches.*	*Inches.*				*Pounds.*	
9346	With heart	2¼	2.45	2.40	10	6	46	4,640 4,530 4,730	2 strands and heart at the splice. Do. Do.
9347	Without heart............	2¼	2.45	2.35	11	....	44	5,020 4,980 4,910	2 strands at the splice. 1 strand at the splice Do.
9344	With heart	3	3.03	3.10	17, 17, 17, 16	6	73	8,710 8,620 8,420	1½ strands and heart at the splice. 2 strands and heart at the splice. 1 strand and heart at the splice.
9345	Without heart............	3	2.98	3.00	18, 18, 17, 17	....	70	8,020 8,750 8,760	1 strand at the splice. Do. Do.
9342	With heart	4½	4.79	4.30	37, 37, 37, 38	12	161	18,250 16,600 19,580	1 strand and heart at the splice. Do. 2 strands and heart at the splice.
9343	Without heart............	4½	4.70	4.25	39	....	156	15,520 17,200 18,100	1 strand at the splice. Do. Do.

MANILA ROPE, COARSE YARNS, 3 STRANDS, 18 YARNS EACH.

[Nominal circumference, 3″.]

No. of test.	Actual circumference.	Actual diameter.	Lay, one turn in.	Length.		Weight.	Weight per fathom.	Tensile strength.			Parted.
								Total.	Mean.	Per pound of weight per fathom.	
	Inches.	*Inches.*	*Inches.*	*Feet.*	*Inches.*	*Lbs. oz.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	
9407	3.21	1.05	2.65	68	3½	18 1¼	1.59	9,980 9,320 9,890	9,730	6,119	1 strand at middle of length. 1 strand at the splice. Do.

MANILA HAWSER; CONSISTS OF 3 HAWSER STRANDS. EACH HAWSER STRAND HAS 3 STRANDS OF 11 YARNS EACH.

[Nominal diameter of hawser, 1¼″.]

9408	4.10	1.33	3.64	18	½	8 2½	2.71	7,540 7,620	7,580	2,797	1 strand at the splice. 1 strand 16″ from splice.

MANILA HAWSER; CONSISTS OF 6 HAWSER STRANDS AND ROPE CORE WITH 3 STRANDS OF 5 YARNS EACH. EACH HAWSER STRAND HAS 3 STRANDS OF 4 YARNS EACH.

[Nominal diameter of hawser, 1¼″.]

9409	3.53	1.16	4.00	18	7	6 15¾	2.25	7,150 6,980	7,065	3,140	3 strands at the splice. 3 strands 6″ from splice.

TARRED SISAL LATH-YARN STRAND.

Strand secured by taking 2 turns around pins, held against turning in the jaws of the testing machine, and ends then made fast to cleats. Length of strand between pins, 5 feet.

No. of test.	Yarns in strand.	Lay of yarns, one turn in.	Tensile strength.	Mean.	Parted.
		Inches.	*Pounds.*	*Pounds.*	
9485	130	16	16,300	15,647	At the pin.
			16,540		Do.
			14,100		Do.

FIREPROOFED WOOD.

FIREPROOFED WOOD.

SPECIMENS FROM THE ELECTRIC FIRE PROOFING COMPANY.

Specimens were received of the following kinds of woods: White pine, white oak, Oregon pine, birch, whitewood.

Specimens were in duplicate, one sample of each in its ordinary state and one which had been fireproofed.

Excepting pieces of Oregon pine, the treated and the untreated samples came from different sticks.

The tests included observations on the fireproof properties of the wood; on the compressive and transverse strength; a specific gravity determination, and qualitative analysis of elements soluble in water which were present in the treated samples.

The fireproofed samples were darker in color than the ordinary wood and appeared heavier than the latter.

The fire-resisting properties were determined upon thin shavings of the woods and small sticks; the latter would not blaze in the case of the treated samples.

In each case the shavings of the untreated samples ignited and burnt with a blaze freely. Shavings from the fireproofed woods, when held over a lighted candle, behaved as follows:

1. White pine, painted sample.—Shavings blazed with difficulty and generally stopped burning when removed from the flame of the candle, but while blazing emitted a hissing sound.
2. White pine.—Shavings would not remain blazing.
3. White pine.—Some shavings burnt slowly and were easily extinguished, others burnt more freely, the thinner shavings blazing the more readily.

Three samples of Oregon pine furnished shavings which would not blaze.

After prolonged heating in a dry muffle at 212° F., white pine and Oregon pine sticks assumed a dark brown color; the shavings were short and brittle.

The samples retained their fireproof qualities and would not blaze.

The white-oak shavings would not blaze. Shavings from the surfaces of the first birch stick blazed, but were easily extinguished. Shavings from places below the original surface blazed with difficulty.

From the second birch stick the shavings from the original surface blazed. Shavings taken from below the original surface would not blaze.

The original surfaces of the birch sticks were stained dark red and coated with a varnish. The blazing of the surface shavings was attributed to the inflammability of the varnish.

The whitewood shavings blazed, but not freely, and were easily extinguished.

Shavings of these several kinds of wood were washed in cold water, remaining in the water baths about two hours each, after which they were dried.

The shavings now in each case blazed and burnt briskly, the fireproof properties having been eliminated and the wood apparently restored to its ordinary condition as regards inflammability.

Specific gravity determinations on two samples of Oregon pine, both from the same stick, gave values as follows:

Ordinary sample	.5153
Fireproofed sample	.6361

Under transverse tests the fireproofed wood in three instances was the weaker; in two instances it was the stronger, but in one of these two instances the low strength of the ordinary wood was due to a crossgrained specimen, which failed with an oblique fracture away from the center of the stick.

The more brittle fractures of the fireproofed samples are illustrated in the accompanying photograph, taken after testing an ordinary and a fireproofed sample of birch wood.

Under compression loads the ordinary sample of Oregon pine was stronger than the fireproofed sample.

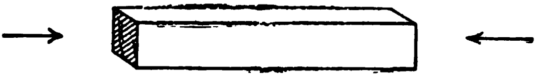
Qualitative analyses showed the presence of ammonia, phosphoric, sulphuric, and hydrochloric acids in the fireproofed wood, which probably existed as phosphates, sulphates, and chlorides of ammonium.

These salts are soluble in water, and it is seen that after they are washed out the wood resumes its ordinary nonfireproof character.

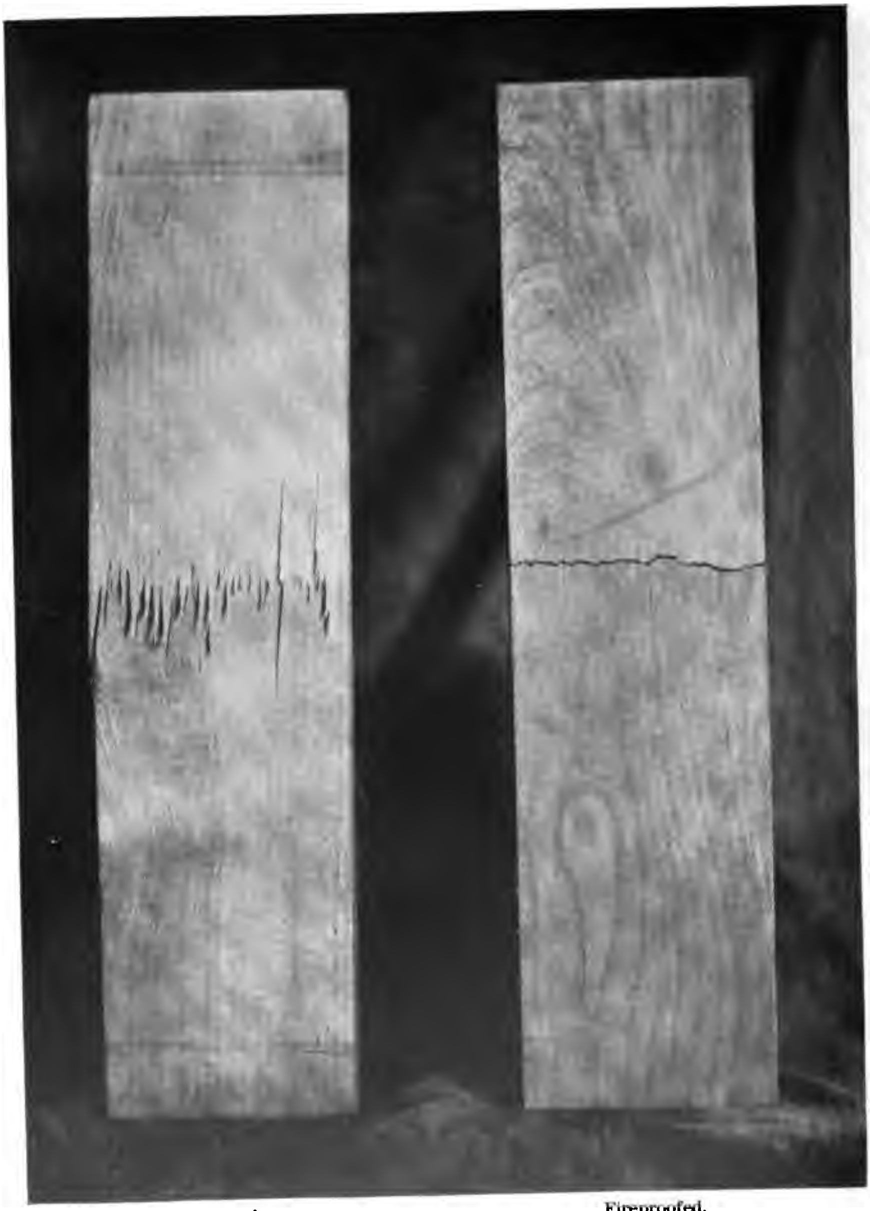
COMPRESSION TESTS ENDWISE THE GRAIN.

OREGON PINE.

An ordinary and fireproofed specimen from the same stick.



No. of test.	Description.	Dimensions.			Sectional area.	Ultimate strength.		Fracture.
		Length.	Width.	Thickness.		Total.	Per square inch.	
		Inches.	*Inches.*	*Inches.*	*Square Inches.*	*Pounds.*	*Pounds.*	
9374	Ordinary	11.99	1.78	2.02	3.60	30,700	8,528	Fibers crushed in an oblique direction, 3″ to 4½″ from end of specimen.
9375	Fireproofed...	11.98	1.78	2.02	3.60	24,780	6,883	Fibers crushed slightly oblique in direction 2″ from end of specimen.

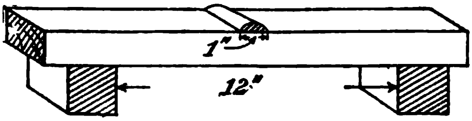


Natural.

Fireproofed.

PHOTOGRAPH SHOWING FRACTURES OF NATURAL AND FIREPROOFED WOOD.

TRANSVERSE TESTS.



Ends supported 12 inches apart, loaded at the middle.
Duplicate tests made on the same kind of wood, but samples were not from the same sticks.

WHITE PINE.

No. of test.	Description.	Dimensions.		Ultimate strength.		Remarks.
		Breadth.	Depth.	Total.	Modulus of rupture, R.	
		Inches.	*Inches.*	*Pounds.*	*Pounds.*	
9376	Ordinary........	3.30	1.37	3,860	11,215	
9377	Fireproofed.....	3.30	1.37	3,355	9,748	
9378	Ordinary........	2.95	.79	858	8,393	Crossgrained. Eccentric fracture, splitting along the grain obliquely.
9379	Fireproofed.....	2.95	.79	1,164	11,387	

BIRCH.

9380	Ordinary........	3.49	.78	2,726	23,145	
9381	Fireproofed.....	3.49	.78	1,880	15,962	

WHITE OAK.

9382	Ordinary........	3.73	.47	998	21,774	
9383	Fireproofed.....	3.74	.47	702	15,316	

WHITEWOOD.

9384	Ordinary........	2.94	.44	373	11,779	
9385	Fireproofed.....	2.94	.44	389	12,284	

The fractures of the fireproofed specimens were generally short and brittle on the tension side of the wood; the ordinary specimens presented tougher splintering fractures.

COMPRESSION OF BALATA.

No. 9491.

SAMPLE MARKED 1.

Length, ″.65.
Diameter, 3″.11.
Sectional area, 7.60 square inches.
Gauged length, ″.65.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,800	500	0.	0.	Initial load.
7,600	1,000	.133	....	
15,200	2,000	.254	....	
22,800	3,000	.310	....	Resilience, ″.014.
15,200	2,000	.309	....	
7,600	1,000	.304	....	
3,800	500	.296	....	

No. 9492.

SAMPLE MARKED 3.

Length, ″.68.
Diameter, 3″.57.
Sectional area, 10 square inches.
Gauged length, ″.68.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
5,000	500	0.	0.	Initial load.
10,000	1,000	.112	....	
20,000	2,000	.211	....	Resilience, ″.012.
30,000	3,000	.260	....	
20,000	2,000	.260	....	
10,000	1,000	.254	....	
5,000	500	.248	....	

No. 9493.

SAMPLE MARKED 4.

Length, ″.65.
Diameter, 3″.12.
Sectional area, 7.64 square inches.
Gauged length, ″.65.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
3,820	500	0.	0.	Initial load.
7,640	1,000	.102	....	
15,280	2,000	.221	....	Resilience, ″.012.
22,920	3,000	.275	....	
15,280	2,000	.274	....	
7,640	1,000	.269	....	
3,820	500	.263	....	

No. 9494.

ANNULAR SAMPLE.

Length, 1″.35.
Exterior diameter, 5″.56.
Interior diameter, 3″.26.
Sectional area, 15.93 square inches.
Gauged length, 1″.35.

Applied loads.		In gauged length.		Remarks.
Total.	Per square inch.	Compression.	Set.	
Pounds.	*Pounds.*	*Inch.*	*Inch.*	
7,965	500	0.	0.	Initial load.
15,930	1,000	.218	....	
31,860	2,000	.374	....	Resilience, ″.038.
47,790	3,000	.454	....	
31,860	2,000	.448	....	
15,930	1,000	.432	....	
7,965	500	.416	....	

CHEMICAL ANALYSES.

STEEL AND CAST IRON.

CHEMICAL ANALYSES.

STEELS FROM SPRINGFIELD ARMORY.

No. of tension test.	Description.	Marks.	Carbon.	Manganese.	Silicon.	Sulphur.	Phosphorus.	Copper.	Nickel.	Remarks.
5720	Steel for Gatling-gun barrels	C 6	0.562	1.281	0.231	0.096	0.060	0.165	....	
5730	Rifle barrel steel	77	0.440	0.550	0.205	0.047	0.060	0.020	....	Sanderson-English.
5731	.....do	S 1	0.688	0.530	0.126	0.025	0.027	0.033	....	Sanderson-American.
5728	.....do	75 S	0.470	1.273	0.188	0.082	0.083	0.170	....	
5729	.....do	76	0.503	1.609	0.141	0.077	0.092	0.043	....	
5727	.....do	75–3	0.565	1.200	0.100	0.080	0.092	0.159	....	
5752	.....do	A 1	0.728	1.007	0.272	0.048	0.079	....	....	From forged form for barrel.
5753	.....do	A 1	0.721	0.910	0.285	0.054	0.083	....	....	Do.
5763	.....do	S	0.476	1.290	0.216	0.096	0.080	....	....	
	Steel for bolt	....	0.710	0.361	0.208	0.036	0.026	0.175	....	
	Steel for cocking piece	....	0.874	0.420	0.202	0.027	0.038	0.000	....	
	Steel for hinge-bar head	....	0.727	0.344	0.192	0.010	0.033	0.000	....	
	Steel extractors	....	0.763	0.526	0.174	0.025	0.018	0.084	....	
	Steel for cocking pieces	....	0.840	0.542	0.169	0.020	0.016	0.079	....	
5776	Rifle-barrel steel	78	0.454	1.162	0.103	0.063	0.065	0.050	....	
5784	Steel for receivers	34 R E	0.184	0.500	0.015	0.117	0.113	0.018	....	
5785	Rifle-barrel steel	79	0.431	0.977	0.194	0.031	0.119	0.025	....	
5795	Steel for receivers	36 R	0.300	1.012	0.106	0.043	0.114	0.050	....	
5796	.....do	36 R F	0.312	0.998	0.096	0.047	0.119	0.040	....	
5831	Rifle-barrel steel	78–2	0.544	1.184	0.119	0.057	0.067	0.075	....	
5832	Steel for receivers	37 R 2	0.343	1.220	0.109	0.123	0.089	0.035	....	
5947	Rifle-barrel steel	78	0.472	1.169	0.122	0.050	0.065	0.078	....	

MISCELLANEOUS STEELS.

No. of tension test.	Description.	Marks.	Carbon.	Manganese.	Silicon.	Sulphur.	Phosphorus.	Copper.	Nickel.	Remarks.
5786	Tube 10″ steel B. L. rifle	8863 B_2 B T_3 M	0.427	0.750	0.181	0.030	0.024	0.036	....	
5745	Jacket 10″ steel B. L. rifle	9020 B_2 MT_2 M	0.540	0.760	0.275	0.028	0.026	....	....	
5746	Tube for 12″ B. L. rifle mortars	9198 B_3 MT_2 M	0.500	0.752	0.285	0.027	0.026	....	....	
5777	.....do	9390 B_3 MT_2 M	0.461	0.765	0.220	0.025	0.080	0.035	....	
5773	.....do	12 M R 31 T MT_1 O	0.481	0.729	0.155	0.027	0.038	0.080	....	
5787	Tube 12″ steel B. L. rifle	9428 B_2 MT_2 M	0.500	0.700	0.188	0.027	0.024	0.042	....	

MISCELLANEOUS STEELS—Continued.

No. of tension test.	Description.	Marks.	Carbon.	Manganese.	Silicon.	Sulphur.	Phosphorus.	Copper.	Nickel.	Remarks.
	Bodies 3".6 B. L. field mortars	8779 B_2	0. 380	0. 807	0. 215	....	....	....	....	
	.....do	X—4591	0. 556	0. 588	0. 296	....	....	....	....	
5789	Jacket 3".2 B. L. steel field gun	32 R 191 J MT_1 O	0. 621	0. 750	0. 211	0. 021	0. 029	0. 042	....	
5790	.....do	32 R 193 J MT_1 O	0. 600	0. 736	0. 201	0. 020	0. 028	0. 042	....	
5791	.....do	32 R 194 J MT_2 M	0. 550	0. 729	0. 199	0. 025	0. 031	0. 037	....	
5923	Cast steel from bodies of 1,000-pound shells	T_1	0. 594	0. 716	0. 630	0. 085	0. 064	0. 032	....	
5924		T_2	0. 561	0. 730	0. 670	0. 100	0. 060	0. 045	....	
5925		T_3	0. 575	0. 690	0. 626	0. 098	0. 063	0. 030	....	
5943	.....do	T 4849	0. 454	0. 684	0. 648	0. 105	0. 061	0. 036	....	
5944	.....do	T 4855	0. 445	0. 620	0. 629	0. 105	0. 055	0. 032	....	
5945	.....do	11212	0. 569	0. 891	0. 058	0. 088	0. 098	0. 040	....	
5946	.....do	11212	0. 445	0. 870	0. 052	0. 075	0. 093	0. 042	....	
5940	Nickel steel	8 N I R H I	0. 200	0. 270	0. 010	0. 025	0. 018	0. 601	7. 200	
5941	.....do	19	0. 220	0. 294	0. 010	0. 028	0. 018	0. 558	7. 072	

CAST IRON FURNISHED BY PRIVATE PARTIES FOR ORDNANCE MATERIAL.

No. of tension test.	Description.	Marks.	Carbon.			Manganese.	Silicon.	Sulphur.	Phosphorus.
			Total.	Graphitic.	Combined.				
5722	Top carriage, 8″ disappearing gun carriage.	PTC 35	3.136	2.075	1.061	0.387	1.034	0.133	0.475
5743	.....do...............	PTC 34	3.136	2.004	1.132	0.467	1.175	0.146	0.658
5742	.....do...............	PTC 38	3.040	2.454	0.586	0.513	0.940	0.115	0.638
5794	.....do...............	TC 56	2.917	2.290	0.627	0.388	1.410	0.124	0.451
5747	Base ring, 8″ disappearing gun carriage.	PBR 39	3.294	2.413	0.881	0.524	1.435	0.130	0.567
5793	.....do...............	BR 55	2.945	2.230	0.715	0.401	1.410	0.120	0.340
5488	Racer, 8″ disappearing gun carriage.	R 41 ITIX	3.287	2.808	0.480	0.398	1.118	0.163	0.580
5652	10″ limited-fire disappearing gun carriage.	10	3.000	2.454	0.546	0.630	1.044	0.063	0.858

TARGET CLOTH.

TARGET CLOTH.

SAMPLES TESTED 2 INCHES WIDE BY 12 INCHES LONG BETWEEN THE JAWS OF TESTING MACHINE.

No. of test.	Contributor.	Picks per inch.		Elongation in 10 inches.		Tensile strength.	
		Warp.	Filling.	Warp.	Filling.	Warp.	Filling.
				Inches.	*Inches.*	*Pounds.*	*Pounds.*
9416	Catlin & Co	40	36	2.10	1.43	116	122
9446				2.12	1.41	121	117
9447				2.15	1.55	128	149
9448				2.03	1.51	119	135
9417	John Early & Co	62	62	1.45	1.26	82	77
9418	John Wannamaker	54	52	1.45	1.30	102	108
	O'Jaffe & Pinkne:						
9419	A	59	56	1.48	1.15	79	78
9420	B	64	57 to 66	1.13	1.20	87	88
9421	C	65	69	1.33	1.21	99	97
9422	D	66	64	1.55	1.10	89	72
9423	J. H. Lane & Co	47	43	1.95	1.10	112	143
				1.97	1.02	111	129
9442				2.00	1.35	122	153
9443				2.10	1.34	121	152
9449				2.03	1.20	122	143
9450				1.97	1.17	114	132
9451				2.00	1.20	122	146

PRIVATE TESTS.

TESTS MADE FOR PRIVATE PARTIES DURING THE FISCAL YEAR ENDED JUNE 30, 1898.

Date.	Material.	For whom tested.		
		Name.	City.	State.
1897.				
July 7	Cast iron	Builders' Iron Foundry	Providence	R. I.
15	Cotton belting	Hub Rubber Co	Boston	Mass.
17	Cotton and hemp belting.	Davis & Pinkham	Somerville	Mass.
17	Hollow shafting	J. H. Roberts & Co	Boston	Mass.
21	Steel plates	Bethlehem Iron Co	South Bethlehem	Pa.
22	.....do	Hartford Steam Boiler Inspection and Insurance Co.	Hartford	Conn.
27	Steel tubing	The Shelby Tube Co	Shelby	Ohio.
28	Steel plates	Bethlehem Iron Co	South Bethlehem	Pa.
Aug. 7	Manila rope	Pearson Cordage Co	Boston	Mass.
9	Steel plate	Edwd. Kendall & Sons	Cambridgeport	Mass.
9	Wrought-iron bolt	James Flynn	Boston	Mass.
9	Shafting	J. H. Roberts & Co	.....do	Mass.
11	Wire rope	John C. Page & Co	.....do	Mass.
11	Chain	A. E. Stevens & Co	Portland	Me.
16	Steel plates	Edwd. Kendall & Sons	Cambridgeport	Mass.
17	Manila rope	Standard Rope and Twine Co	Allston	Mass.
17	Steel plates	Bethlehem Iron Co	South Bethlehem	Pa.
24	Bicycle tires	L. C. Chase & Co	Boston	Mass.
25	Chain	A. E. Stevens & Co	Portland	Me.
25	Limestone	Ozark Stone and Lime Co	Kansas City	Mo.
28	Bronze	Hyde Windlass Co	Bath	Me.
Sept. 1	Wrought-iron plate.	Central Iron and Steel Co	Harrisburg	Pa.
1	Steel-wire rope	John A. Roeblings	Trenton	N. J.
9	Manila cordage	Standard Rope and Twine Co	Allston	Mass.
11	Wrought-iron plates.	Central Iron and Steel Co	Harrisburg	Pa.
11	O. H. basic steel	Birmingham Rolling Mill Co	Birmingham	Ala.
18	Rubber belting	J. H. Lane & Co	Boston	Mass.
22	Wrought-iron plates.	Central Iron and Steel Co	Harrisburg	Pa.
22	Bronze	Bath Iron Works	Bath	Me.
22	Manila raft rope	Standard Rope and Twine Co	Allston	Mass.
22	Bricks	Cass Gilbert	St. Paul	Minn.
27	Wrought-iron plates.	Central Iron and Steel Co	Harrisburg	Pa.
Oct. 1	Bronze	Bath Iron Works	Bath	Me.
2	Wrought-iron plates.	Central Iron and Steel Co	Harrisburg	Pa.
15	Tire cloth	J. H. Lane & Co	Boston	Mass.
18	Bricks	Texas and Pacific Coal Co	Thurber	Tex.
20	Ladle shank	Mechanics' Iron Foundry Co	Boston	Mass.
30	Steel rod	Chase, Parker & Co	.....do	Mass.
30	Cast iron	Calvin Foundry Co	Providence	R. I.
Nov. 8	Springs	McKay-Bigelow Heeling Machine Association.	Winchester	Mass.
9	Splice bars	P. H. Dudley	New York	N. Y.
11	Cloth	Converse, Stanton & Cullen	Boston	Mass.
11	Bricks	Cass Gilbert	St. Paul	Minn.
26	Canvas belting	J. H. Lane & Co	Boston	Mass.
30	Taylor iron	B. M. Jones & Co	.... do	Mass.
30	Bronze	Hyde Windlass Co	Bath	Me.
Dec. 2	Canvas belting	J. H. Lane & Co	Boston	Mass.
8	Chain	H. J. Crandall & Son	East Boston	Mass.
10	Sheeting	Hood Rubber Co	Boston	Mass.
10	Steel bar	Chase, Parker & Co	.....do	Mass.
21	Yellow-pine column.	Evarts, Choate & Beaman	New York	N. Y.
28	Columns	John Lally	Waltham	Mass.
1898.				
Jan. 4	Steel tube	Marlin Fire Arms Co	New Haven	Conn.
6	Cotton cloth	J. H. Lane & Co	Boston	Mass.
8	Hydraulic gauges	American Steam Gauge Co	.....do	Mass.
8	Cast iron	Malden Electric Co	Malden	Mass.
11	Old manila rope	J. M. Douglas	Boston	Mass.
15	Bricks	Lancaster Brick Co	Buffalo	N. Y.
17	Bronze	Hyde Windlass Co	Bath	Me.
17	Terra cotta	Messer, Sanguinet & Messer	Galveston	Tex.

Tests made for private parties during the fiscal year ended June 30, 1898—Continued.

Date.	Material.	For whom tested.		
		Name.	City.	State.
1898.				
Jan. 17	Manila rope	Standard Rope and Twine Co	Allston	Mass.
20	Steel plate	Schenectady Locomotive Works	Schenectady	N. Y.
24	do	Edward Preble	East Boston	Mass.
24	Air-brake hose	Revere Rubber Co	Chelsea	Mass.
Feb. 3	Cotton sheeting	J. H. Lane & Co	Boston	Mass.
3	Wrought-iron bolts.	Archibald Wheel Co	Lawrence	Mass.
3	Rubber belting	Revere Rubber Co	Chelsea	Mass.
9	Cloth	Hood Rubber Co	East Watertown	Mass.
10	Bronze	Hyde Windlass Co	Bath	Me.
15	Rubber belting	J. H. Lane & Co	Boston	Mass.
17	Cotton belting	Main Belting Co	do	Mass.
24	Tobin bronze	A. H. Emery	Stamford	Conn.
Mar. 1	Cotton sheeting	Hood Rubber Co	East Watertown	Mass.
9	Cotton fabric	L. C. Chase & Co	Chelsea	Mass.
10	Bricks	Clarence L. Smith	New York	N. Y.
10	Shelf supports	The Snead & Co. Iron Works	do	N. Y.
15	Steel bars	Arthur Perrin	Brookline	Mass.
15	Steel plates	Hartford Steam Boiler Inspection and Insurance Co.	Hartford	Conn.
22	Bricks	Conococheaque Brick and Earthenware Co.	Williamsport	Md.
22	Cast iron	Frank M. Gilley	Chelsea	Mass.
31	Cloth	Hood Rubber Co	East Watertown	Mass.
31	Cotton cloth	L. C. Chase & Co	Chelsea	Mass.
Apr. 11	Brick piers and single bricks.	Norcross Bros	Boston	Mass.
12	Bronze	Bath Iron Works	Bath	Me.
14	Rubber belting	J. H. Lane & Co.	Boston	Mass.
15	Tobin bronze	A. H. Emery	Stamford	Conn.
20	Steel bars	Arthur Perrin	Brookline	Mass.
22	Cotton cloth	Hood Rubber Co	East Watertown	Mass.
28	Hollow stay bolt	E. D. Leavitt	Cambridgeport	Mass.
May 4	Steel bar	Chase, Parker & Co	Boston	Mass.
16	Shaft in copper sleeve.	Arthur Birch	Arlington	Mass.
17	Bricks	Washington Hydraulic Press Brick Co.	Washington	D. C.
18	Steel bar	Savage Arms Co	Utica	N. Y.
21	Bicycle tires	National India Rubber Co	Boston	Mass.
	Pig iron	C. L. Peirson & Co	do	Mass.
June 4	Steel bar	Savage Arms Co	Utica	N. Y.
7	do	The Marlin Fire Arms Co	New Haven	Conn.
7	Manila rope	Fearing, Hall & Whiton	Boston	Mass.
7	Steel bar	The Kinsley Iron and Machine Co.	Canton	Mass.
7	Marble composite	J. R. Griswold	Watertown	Mass.
8	Bricks	Lehmann-Kohlsaat Clay Works	Chicago	Ill.
11	Steel bar	The Kinsley Iron and Machine Co.	Canton	Mass.
13	Rubber belting	Revere Rubber Co	Chelsea	Mass.
13	Copper cylinders	The Brown Segmental Tube Wire Gun Co.	Birdsboro	Pa.
18	Bicycle-tire fabric	Converse, Stanton & Co	Boston	Mass.
18	Turn-buckle	Carson-Trench Machine Co	do	Mass.
20	Copper	American Tube Works	do	Mass.
21	Hydraulic gauges	Ashton Valve Co	do	Mass.

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